

## EXHIBIT No. 59

## UNITED STATES PACIFIC FLEET

U. S. S. PENNSYLVANIA, Flagship

A2-11/FF12

A4-1/VZ

A3?VZ (95)

Serial 059

C/O FLEET POST OFFICE,  
Pearl Harbor, T. H., Jan. 7, 1942.

Secret

From: Commander-in-Chief, United States Pacific Fleet.

To: Commander-in-Chief, United States Fleet.

Subject: Airplane situation, Hawaiian Area.

References:

(a) ComAirScoFor Conf. Ltr. Serial 0755 of December 18, 1941, addressed to Opnav.

(b) ComAirScoFor Conf. L Serial 0767 of December 24, 1941 addressed to Buairo.

(c) CinCPAC desp. 041001 of January 1942.

(d) CinCPAC desp. 050547 of January 1942.

Enclosure. (A) ComPatWing TWO Secret Ltr. Serial 0033 of December 30, 1941.

1. In recent despatches, references (c) and (d), the Commander-in-Chief, Pacific Fleet, pointed out the vital need for improvement of the aircraft situation in the Hawaiian area. This letter is written in amplification.

2. The following factors must form the basis for any consideration of aircraft requirements here:

(a) *The attack of 7 December will be followed by others.* The enemy has exploited the element of surprise. He can however, use it again, although to a lesser extent because of local alertness measures, if adequate search is not maintained. In any case, his strength in carriers and heavy ships is such that he need not depend on surprise. His objectives in the first assault were aircraft and ships. There remain untouched the very important and tempting objectives of fuel supply, navy yard industrial establishment and drydocks, commercial docks and the city of Honolulu. There remains, further, as an ultimate objective the taking of the island of Oahu itself, retention of which is by no means assured with the forces now available to us.

(b) *Japanese aircraft carrier aviation, with all due allowance for the advantage of surprise, proved itself on 7 December to be in a very high state of development.* This applies with full force not only to material and to the training, skill and determination of personnel, but also to the unquestionably brilliant manner in which the entire expedition was conceived, planned and handled. This arm of the Japanese fleet has been greatly underestimated. Its potentialities must be recognized from now on.

(c) *Aircraft for Hawaiian defense must comprise adequate forces for long range search, for striking and for local interception.* All of these are vital for effective defense. None of these can be effective if any of the three is inadequate. It must be assumed that the Japanese will continue to have excellent intelligence reports of our activities here. An organization as perfect as that which provided complete information for every minute detail of the first attack cannot safely be assumed to have been eliminated. It follows that inability to maintain an effective search can hardly fail greatly to increase the probability of renewed attack.

3. The objectives of long range search are to make it possible to strike any enemy force before it can strike Oahu and to give ample advance warning of any such attempt. Provision for the first of these objectives covers the second. As will readily be seen by simple mathematical analysis (see enclosure (A)), the search should extend out to about 800 miles before planes turn homeward each day in order to:

(a) Make it possible to reach the enemy with an air striking force during daylight on the day he is discovered, and

(b) Prevent the enemy, if undiscovered on the previous day, from reaching a position close enough for launching aircraft before the succeeding day's search has reached him.

4. Search requirements are based on the following assumptions:

(a) *Carrier aircraft may be launched 300 miles from Oahu.* There is definite evidence that carrier aircraft were launched and recovered on 7 December 225 and 300 miles respectively from Oahu. These launching and recovery points can be interchanged without increasing the demand on Japanese aircraft endurance that has already been met. It is possible that even greater ranges might be used by substitution of bombs for torpedoes and with retention near enemy carriers of shorter range types for their local defense.

(b) *Carrier speed for the run-in may be 27 knots.* This speed is not unreasonable and is believed to have been used on 7 December. The enemy can accept the logistic problem in fuel, for he did so.

(c) *It cannot be assumed that any direction of approach may safely be left unguarded.* The fuel problem is no deterrent, for the approach was made from the north on 7 December. Increase in difficulty of the logistic problem would not be proportionately great if even an approach from the east were attempted. At the same time, as discussed above, neglect of any sector is apt soon to be known.

(d) *Air Search visibility is 25 miles.* That is, aircraft during the majority of the search are 50 miles apart, although they are closer together than this from departure until they are 300 miles out. This visibility assumption is obviously optimistic, particularly since clear weather will seldom extend over the entire search area. It is, however, the best (and the most) that can be done with aircraft available unless very large areas are to be entirely neglected. Although each succeeding day's search tends to disclose, at closer range, what might have been missed on the previous day, the long range search should be far more positive than is now possible.

5. The upshot of the foregoing assumptions, *which include perfect visibility*, is that about 50 planes (the number varying slightly with type) are needed daily for search. This number cannot be reduced, as suggested in the enclosure, if and when *reliable* radar equipment for airplanes is *available*, for this equipment will merely serve to counter the effect of poor visibility. Actually, toward meeting at present the minimum requirement of 50 per day, the situation is as follows: With departure of Patrol Squadron Twenty-two for the Asiatic theater and with completion of the current transfer here of three squadrons from the mainland, the number of patrol planes here becomes 67, with 4 of these under repair for at least a month. The number of Army heavy bombers (B-17's) here is 42, with 2 additional expected later. (Note that paragraph 2 of the enclosure is not up to date on these patrol plane and Army bomber figures). This leaves a total on hand of 109 long range planes.

6. With these it is not possible simultaneously and effectively to maintain necessary long range search operations, to keep available a useful air striking force, and to meet constant requirements for special missions, such as covering submarine contracts and guarding convoy approach and departure, without having on hand for search alone at least three times the number of planes that are needed for search on any given day. There is no way of getting around this if material and personnel are to maintain the pace. Neither one nor the other can do more.

7. Search actually being made has had to be reduced to the following basis:

(a) The radius for the long range planes is 700 miles. Neither patrol planes nor B-17's can go farther, with reasonable margin for safe return, while carrying any bombs.

(b) 25 patrol planes and 12 Army B-17's are being used daily for search (18 B-17's are being held continuously ready as a minimum striking force). The long range searching planes cover total sectors of about 290 degrees. Such relatively ineffectual planes (VSO, VJ and Army B-18's) as are available are used to cover remaining sectors totalling about 70 degrees to distances of 200 or 300 miles.

8. These figures vary somewhat from day to day, but the overall result is that only *four-fifths* of the circle is being covered to a reasonable range, and this with mediocre effectiveness, although available material and personnel are being strained to the limit. Furthermore, the remaining fifth is being covered very poorly, to short and inconclusive ranges. Still further, this essential expenditure of effort leaves no patrol planes available for support of task forces



on special missions and none for our outlying island bases, beyond the two each that are now being maintained on an exchange basis at Johnston and Palmyra.

9. To improve the situation outlined above, which is not only critical but dangerous, there should be earliest possible action toward increasing the patrol wings in the Hawaiian area to at least twelve 12-plane squadrons of long range planes. Commander Patrol Wing Two in enclosure (A), and Commander Scouting Force in references (a) and (b), make entirely clear the very great advantages of naval use of long range land planes where this is practicable. The patrol wing increase to twelve squadrons should include the provision that at least one-half of these planes be of the B-24 type. This is essential not only because of their superior characteristics but also because, otherwise, the limited seaplane operating potentialities of this area would be too crowded for war conditions.

10. It is realized that this expansion cannot be accomplished immediately. Nevertheless, the necessary machinery therefor should be set in motion now at highest priority. Meanwhile, favorable consideration of reference (c), asking for B-24 landplane bombers at once in place of the 17 PBV-3 planes now here, is earnestly recommended. This is a small part of the necessary increase, but, as pointed out in the reference, it is relatively easy to do and it will make an important immediate improvement in the picture.

11. The request of the Commanding General, Hawaiian Department, for a total of 200 heavy bombers, with which the Commander-in-Chief concurred in reference (d), is amply justified. It must be recognized that renewed attack will almost certainly be in force as great or greater than that of the first attack, which included at least four aircraft carriers, and it may in addition be divided. The only way in which to have any assurance of decisive effect on major enemy attack is to be prepared to strike a heavy blow. But the only available shore-based striking force consists of 18 B-17's, held in reserve daily for this purpose, and such patrol planes, neither searching nor undergoing maintenance, as are not in use for special daily missions. The resultant air striking force is literally trivial. It would be practically useless against surface forces comparable to those that were in this area on 7 December. Its effect could not possibly be decisive. With 200 heavy bombers on hand, however, availability of a powerful striking force for all contingencies can be continuously assured.

12. In all of the foregoing, *Hawaiian air defense* alone has been considered. Any plans for any other uses in the Pacific area for the recommended types of aircraft must include provision of appropriate numbers of additional aircraft.

13. Returning to the immediate situation; with present limited numbers of searching and striking planes we are constantly confronted with the dilemma resulting from the relative futility of either effective search at the expense of striking force or useful striking force at the expense of search. There is no answer to this except more planes. Unless we are to play the inevitably losing game of local air defense alone, the recommended total increases for both the patrol wings and the Hawaiian air force must be soon provided. Meanwhile, it is reiterated that *any* immediate increase for either will vitally improve the present situation.

14. Transmission via registered clipper airmail is authorized for this document.

C. W. NIMITZ.

Copy to:

ComAirScoFor

ComPatWing TWO

BuAero

Opnav

ComdG. Gen'l., Hawaiian Dept.

[1] PW2/A1b-3/  
(0033)

PATROL WING TWO,  
U. S. NAVAL AIR STATION,  
Pearl Harbor, T. H., December 30, 1941.

Secret

From: The Commander Naval Base Defense Air Force (The Commander Patrol Wing TWO).

To: The Commander-in-Chief, United States Fleet.

Via: The Commander-in-Chief, United States Pacific Fleet.

Subject: Long Range, Landplane, Bombers for Scouting in Hawaiian Area; Recommendation for Assignment of.

Reference: (a) Comairscfor Confidential letter A4-1(0755) dated December 18, 1941.

Enclosure: (A) Determination of Search Group Requirements.

(B) Memorandum of Air Corps Liaison Officer.

1. By reference (a) the Commander Aircraft, Scouting Force, set forth the need for long range landplane bombers for use initially as scouts in protective searches from Oahu, and stated briefly the advantages and further uses of such aircraft. It is the purpose of this letter to amplify the presentation of this subject and to present facts which will prove beyond reasonable doubt that the immediate allocation of such equipment to Patrol Wings is vital, not only to defense, but also to future offensive air operations.

2. There are currently 78 PBY aircraft available for flight in the Hawaiian Area, of which 34 are recently received reinforcements. Present search operations require 30 of the available PBY planes to conduct a daily 700 mile radius search from Oahu, covering a 240 degree sector. The remaining 120 degrees is covered daily, with concomitant serious reduction of offensive power by B-17 aircraft of the Army searching to 800 miles; or by B-17 aircraft and VO-VS or VJ aircraft, the latter searching to 200-300 miles, when the B-17s available for search are less than 16. It is evident that such a daily search is only partially effective. The lack of experience and training of Army Air Corps flight crews in performing long range protective search missions over water is a condition which was naturally to be expected. The result of this has the effect of throwing the major part of the burden of search on the Patrol Plane units in this area, and rightly so, for, at the present time, the few long range bombardment aircraft available to the Army in this area, even if used solely as a striking force, are totally inadequate. It is imperative that Hawaiian-based Patrol Wings be provided with sufficient aircraft to take over Oahu searches and to release Army bombers for the stand-by as a striking force. As a guide to the material required a study has been made as outlined in enclosure (A), based upon utilizing PBY aircraft, and [2] upon alternate long range equipment having cruising speeds of 150 and 200 knots. The results of this study are tabulated below:

	PBY	150 knot airplane (4 engines)	200 knot Airplane (4 engines)
Radius of daily search.....	800	840	860
Number searching planes daily (25 mile visibility).....	50	54	54
Flight time per search plane-hrs.....	16.5	11.7	9.0
Total plane hours per month.....	24,750	19,415	14,580
Total number of planes required.....	150	162	162
Number of flight crews required.....	225	243	243
Engine changes per month.....	82.5	129.6	97.2
Spare engines required.....	182	286	214
Fuel consumption per month—gal.....	1,980,000	2,912,250	2,916,000
Average search effectiveness (estimated).....	50%	60%	60-70%



# 1336 CONGRESSIONAL INVESTIGATION PEARL HARBOR ATTACK

With A. S. V. (40 mile visibility assumed)

	PBY	150 knot airplane (4 engines)	200 knot Airplane (4 engines)
Radius of daily search.....	800	840	860
Number searching planes daily.....	32	34	34
Flight time per search plane-hrs.....	16.5	11.7	9.0
Total plane hours per month.....	15,840	11,934	9,180
Total number of planes required.....	96	102	102
Number of flight crews required.....	134	153	153
Engine changes per month.....	52.8	79.5	61.2
Spare engines required.....	117	175	137
Fuel consumption per month—gal.....	1,267,000	1,790,100	1,836,000
Average search effectiveness (estimated).....	75%	95%	100%

3. Conclusions which may be drawn from the above tabulations and from the study, enclosure (A), are as follows:

(a) PBY aircraft are *too slow* for the mission required of them. Their lack of speed not only reduces search effectiveness because of their inability to cover the required area during daylight hours, but also because the excessive duration of flight increases [3] pilot and crew fatigue. The only alternative is to provide planes of sufficient speed to conduct the required search in daylight hours.

(b) Regardless of how fast or how many planes are available, the effectiveness of the search is dependent upon visibility. All planes utilized for search should be provided with A. S. V. equipment with which search effectiveness can be increased to near 100%, despite low visibility. Not only would A. S. V. equipment make the search effective but, by permitting wider coverage by each plane, would reduce the numbers of planes and flight crews required. This, combined with shorter flight hours, would reduce fuel consumption, engine changes, spare engines required, and other maintenance, as well as reducing crew fatigue. It is clear that A. S. V. equipment also is a vital requirement and should be provided on a not-to-delay basis.

(c) The PB2Y-3 airplane has a cruising speed of about 150 knots and adequate range. But the operation of 102 PB2Y-3 airplanes presents more difficulties than the operation of a similar number of landplane bombers. PB2Y-3s are not fast enough. They are not immediately available. While a number of these planes are needed for certain types of missions, the immediate requirement for search is for landplanes of yet higher speed.

(d) Surveying the landplane field two types are available; the B-17 and the B-24. Experience with the B-17 on search has been disappointing. Their cruising speed at the low altitudes required during search is about 155 knots. In order to search to radius 800, auxiliary tanks must be installed in the bomb bays, precluding the carrying of bombs.

(e) The B-24 airplane most nearly meets the requirements of effective search in this area. Available information on characteristics is given in enclosure (B). Provision of 102 B-24 airplanes would provide not [4] only for effective search but also would provide a formidable reserve striking force. It is believed that a number of B-24 aircraft could be made available immediately by diversion from Lend Lease aircraft awaiting delivery. Such diversion is considered vital to the defense of Oahu.

(f) From actual flight experience of our pilots in B-17-E aircraft, I am convinced that experienced patrol plane crews can readily and in short order take over the operation of four-engined landplane bombers.

(g) Some fields are available and others can shortly be made available in the Hawaiian Group which are suitable for, or capable of rapid expansion as necessary to accommodate 102 B-24 Navy long range landplane bombers. These fields include Kaneohe, Ewa, Maui, Barking Sands on Kauai, and Hilo Airport at Hawaii.

## 4. Recommendations:

(a) It is strongly recommended that at least 102 B-24 bombers be allocated to Hawaiian-based Patrol Squadrons, and delivered as rapidly as possible.

(b) Immediately equipping with B-24s of the three patrol squadrons now on the West Coast equipping with PBY-5As is recommended as the first increment.

(c) For the second increment, it is recommended that the 17 PBY-3s now in this area, 7 of which are now due for overhaul, be replaced with 24 B-24s, Patrol Squadron TWENTY-TWO and Patrol Squadron TWENTY-ONE flying the

PBY-3s in succession to the West Coast, and, after a brief training period, returning with B-24s.

(d) The following equipment should be provided for these planes on a *not to delay* basis:

- (1) A. S. V. equipment.
- (2) Converter for use with YE homing device.
- (3) I. F. F. equipment.

/s/ P. N. L. BELLINGER.

[1]

Enclosure A

PATROL WING TWO  
U. S. NAVAL AIR STATION  
Pearl Harbor, T. H.

DETERMINATION OF SEARCH GROUP REQUIREMENTS

A. PBY AIRCRAFT

*Assumptions*

1. Best sustained speed of enemy carrier—27 knots.
2. Enemy carrier can launch an attack at a maximum distance of 300 miles.
3. PBY ground speed during search averages 100 knots.
4. Duration of daylight and dark:

(At Pearl)	Dec. 22	June 22
Daylight.....	11.0 hrs....	13.6 hours.
Dark.....	13.0 hrs....	10.4 hrs.

5. Daily search must cover a radius such that enemy cannot reach the 300 mile launching circle the following morning before the daily search reaches the 300 mile circle.
6. Aircraft depart on search daily at dawn.

Work	22 Dec.	22 June
Launching radius.....	300	300
Enemy's night run (27 x 13).....	(27 x 10.4) 351	281
Enemy's day run before search reaches 300 mile circle		
$\frac{300}{100} \times 27$ .....	81	81
Radius to cover effective at dark.....	732	662

[2] Let a=hours of daylight remaining when plane starts return leg.

Radius of search required is (r)  $732+27(a)$   $662+27(a)$

Radius of search plus transfer (50 miles for 25 mile visibility) equals distance plane goes before starting return leg, equals hours of daylight minus a, times plane speed.

$$732+27a+50=(11-a) 100$$

a=2.5 hrs.

$$662+50=(13.6-a) 100$$

a=5.1

Radius of search (r)  $732+27(2.5)$   $662+27(5.1)$

Radius of search r 799.5 799.7

*Conclusions*

1. Radius of search 800 miles. Daily flight time 16.5 hrs/plane.
2. For radius of visibility of 25 miles requires 50 search planes daily and a total search force of 150 planes.
3. Since radius of visibility usually averages 15 miles, search effectiveness is about 60%. On 22 December plane flies last 550 miles in darkness. This reduces to

290 miles on 22 June. Effectiveness of search is further reduced by this to an estimated 50% coverage over the entire year.

4. Plane hrs/mo—24,750 hrs.
5. Fuel consumption/mo (at 80 gal/hr)—1,980,000 gal.
6. Engine changes per month (at 600 hrs)—\$2.5
- Spare engines required (220% of monthly changes)—182

[3]

B. PBV AIRCRAFT WITH A. S. V. (RADAR)

Intelligence reports (AirBatFor Summary of Air Operations No. 6-41A) stated that British A. S. V. equipment in Coastal Command aircraft has the following performance:

*Forward antenna system*

Range—30 miles.

Cone of search—60° in azimuth (30° on either side of the beam); directly ahead and almost vertically downward.

*Lateral antennae system*

Range—80 miles on both sides.

Cone of search—18° in azimuth (9° on either side of the beam); 30° in elevation; 30° in depression."

(Weight 290 lbs)

From information received on the A. S. V. equipment being installed in our PBV airplanes, it is understood that the performance is adversely affected by lack of British-made cable and that the performance obtained, for this and other installation reasons, is reduced, actual results varying between 10 and 40 miles range. Equipment installed in PBM airplanes however is reported as effective up to 70 miles, and it is expected that somewhat better results may be expected from PBV airplanes when British cable, now on order is installed. (First ship-ment sunk) Assuming that A. S. V. equipment may be depended upon for an effective range of at least 40 miles, the following benefits would result from installation of A. S. V. in PBV aircraft:

*For 40 mile A. S. V. "visibility"*

1. Reduce number of planes required for daily search from 50 to 32.
2. Increase search effectiveness from an average of 50% to about 75%.
3. Reduce plane hours per month for search from 24,750 to 15,840; reduce fuel consumption for search from 1,980,000 to 1,267,000 gallons per month; reduce engine changes per month from \$2.5 to \$2.8.
- [4] 4. Reduce total planes required from 150 to 100; spare engines required from 182 to 117.
5. Reduce crew fatigue and number of plan crews required.

#### Conclusions

1. *The immediate installation of A. S. V. in search aircraft is vital to successful protective aircraft search. It will greatly reduce the material and personnel required for any search.*

#### C. 150 KNOT 4 ENGINED AIRCRAFT

*Assumptions* as before, except for 150 knot ground speed of search aircraft.

Work	22 Dec	22 June
Launching radius.....	300	300
Enemy's night run (27×13).....	(27×10.4) 351	281
Enemy's daylight run before succeeding day's search reaches 300 mile circle		
$\frac{300}{150} \times 27$	54	54
Radium to cover effective at dark.....	705	635

705 80 27a=150 (11-a)

a=4.87

Radius of search r=840

635 80 27a=150 (13.6-a)

a=7.5

r=835

#### Conclusions

1. Radius of search 840 miles. Daily flight time 11.7 hours/plane.

[5] 2. With A. S. V. equipped planes, requires 34 search planes daily (40 mile A. S. V. visibility) and a total force of 12 planes; without A. S. V. 54 planes daily (25 mile visibility) and a total force of 162 planes.



3. Search effectiveness 100% with A. S. V.; 60% without.	
4. Plane hrs/mo:	
With A. S. V.....	11, 934
Without A. S. V.....	19, 415
5. Fuel consumption/mo: (at 150 gal/hr)	
With A. S. V.....	1, 790, 100
Without A. S. V.....	2, 912, 250
6. Engine changes/mo: (at 600 hrs) (4 eng/pland)	
With A. S. V.....	79. 5
Without A. S. V.....	129. 6
Spare engines required: (220% of monthly changes)	
With A. S. V.....	175
Without A. S. V.....	286

D. 200 KNOT 4 ENGINED AIRCRAFT

Assumptions as for A except for 200 knot ground speed of search aircraft.

	22 Dec.	22 June
Launching radius.....	300	300
Enemy's night run.....	351	281
Enemy's daylight run before succeeding day's search reaches 300-mile circle		
300		
200 x 27.....	41	41
Radius to cover <i>effective at dark</i> .....	692	622

$$692 + 80 + 27a = 200 (11-a) \qquad 622 + 80 + 27a = 200 (13.6-a)$$

a	6.3	a	8.9
r	860	r	862

[6] *Conclusions*

1. Radius of search 860 miles. Daily flight time 9 hours.
  2. Requires 34 A. S. V. equipped planes daily; or 54 non-A. S. V.-equipped.
- Total force required:
- |                      |            |
|----------------------|------------|
| With A. S. V.....    | 102 planes |
| Without A. S. V..... | 162 planes |
3. Search effectiveness 100% with A. S. V.; 60% without. All search made during daylight.
  4. Plane hours/month.
- |                      |         |
|----------------------|---------|
| With A. S. V.....    | 9, 180  |
| Without A. S. V..... | 14, 580 |
5. Fuel consumption/month (at 200 gallons/hour).
- |                      |             |
|----------------------|-------------|
| With A. S. V.....    | 1, 836, 000 |
| Without A. S. V..... | 2, 916, 000 |
6. Engine changes/month (at 600 hours).
- |                      |       |
|----------------------|-------|
| With A. S. V.....    | 61. 2 |
| Without A. S. V..... | 97. 2 |
- Spare engines required: (220% of monthly changes)
- |                      |     |
|----------------------|-----|
| With A. S. V.....    | 137 |
| Without A. S. V..... | 214 |

[7] E. DETERMINATION OF TOTAL NUMBER OF PLANES AND FLIGHT CREWS REQUIRED

1. Flight crews should not be required to fly more often than one day in three: i. e., fly one day, rest one day, stand-by one day.
2. Operating policy requires that all available planes not under maintenance be manned and ready for take-off from 30 minutes before to one hour after sunrise, and from one hour before to 30 minutes after sunset. All available planes are on one hour's notice otherwise during daylight, and on 4 hour's notice otherwise at night. This requires services of one crew to stand-by each available airplane on the ground.
3. To provide for special missions in addition to protective search, at least three times the number of aircraft required for daily search should be provided.
4. Initially a minimum of 150% plane crews will be required. The excess over one crew per plane will be utilized to provide a surplus for rest status one day in three and for conducting training until two crews per plane are available.



PATROL WING TWO,  
U. S. NAVAL AIR STATION,  
Pearl Harbor, T. H., December 30, 1941.

*Confidential*

Memorandum to Lieutenant Commander COE, U. S. N.

From: Major W. J. Holzapfel, U. S. A.

The following information on the B-24 airplane is gathered from pilots on the ferry command in the United States and from mechanics who were on the ferry command to England who used this type of airplane:

B-24 is equipped with Pratt and Whitney Twin row engines Model R-1830 with two stage engine driven blowers and developing 1250 horsepower during take-off.

The gas capacity of these airplanes is 3,100 gallons divided into two 1,550 gallon wing tanks. These tanks are not bullet proof. The Consolidated Corporation however is planning on putting in bullet proof tanks which will cut down the gas capacity to 2,490 gallons.

On these trips the thought of fuel economy is never considered. The airplanes were cruised between 29 and 31 inches of mercury, 2,000 RPM at altitudes of 7-10,000 feet. Carburetor, mixture was set at lean. Fuel consumption at these altitudes at these settings, which is considered maximum cruising, was 150 gallons gasoline per hour and the indicated air speed was between 180-200 statute miles per hour.

This airplane has two bomb bays each with 10 bomb stations. Capacity of the bomb bays is 8,000 pounds of bombs. The armament is composed of 9 .50 cal. machine guns and 1 .30.

The weight empty of these airplanes is 30,000 pounds. The authorized gross weight of this airplane (maximum limit as set by manufacturer) is 57,000 pounds. However, conversations with a mechanic who made a trip to England brought out the fact that one such airplane was once loaded to 72,000 pounds and it is reported that the English have loaded one of these airplanes to 83,000 pounds. No difficulties were found in take-off or flying quality of this airplane.

/s/ W. J. HOLTZAPFEL

Exhibit No. 60

(Exhibit No. 60 is, in the main, a work sheet showing dispositions of vessels in Pearl Harbor on the morning of 7 December 1941, which will be found reproduced as Item No. 11, EXHIBITS-ILLUSTRATIONS, Navy Court of Inquiry. These illustrations are bound together following the printed exhibits of the Navy Court of Inquiry.)

SUMMARY OF SHIPS (BY TYPES) AS SHOWN ON EXHIBIT NO.

BB.....	8	(Battleships)
CA.....	2	(Cruisers, heavy)
CL.....	6	(Cruisers, light)
DD.....	29	(Destroyers)
DM.....	8	(Destroyer Minelayers, conv.)
DMR.....	1	(Destroyer Minesweepers, conv.)
SS.....	5	(Submarines)
YFD.....	1	(Floating Drydock)
AB.....	1	(Hospital Ship)
A.....	24	(Auxiliaries) — (2 AO, 2 AVB, 1 AK, 1 AS, 1 IN, 1 Aux. Flag-ship, 3 AB, 2 AG, 2 AD, 2 AVP, 2 AV, 1 CM, 1 AM)