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**CAPABILITIES OF B-36 PARASITE SYSTEMS**

**GENERAL DYNAMICS CORP FORT WORTH TX**

**MAY 1953**

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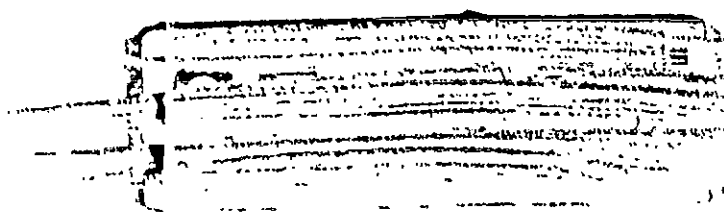
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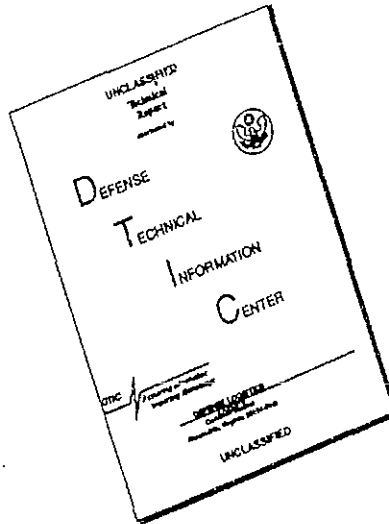
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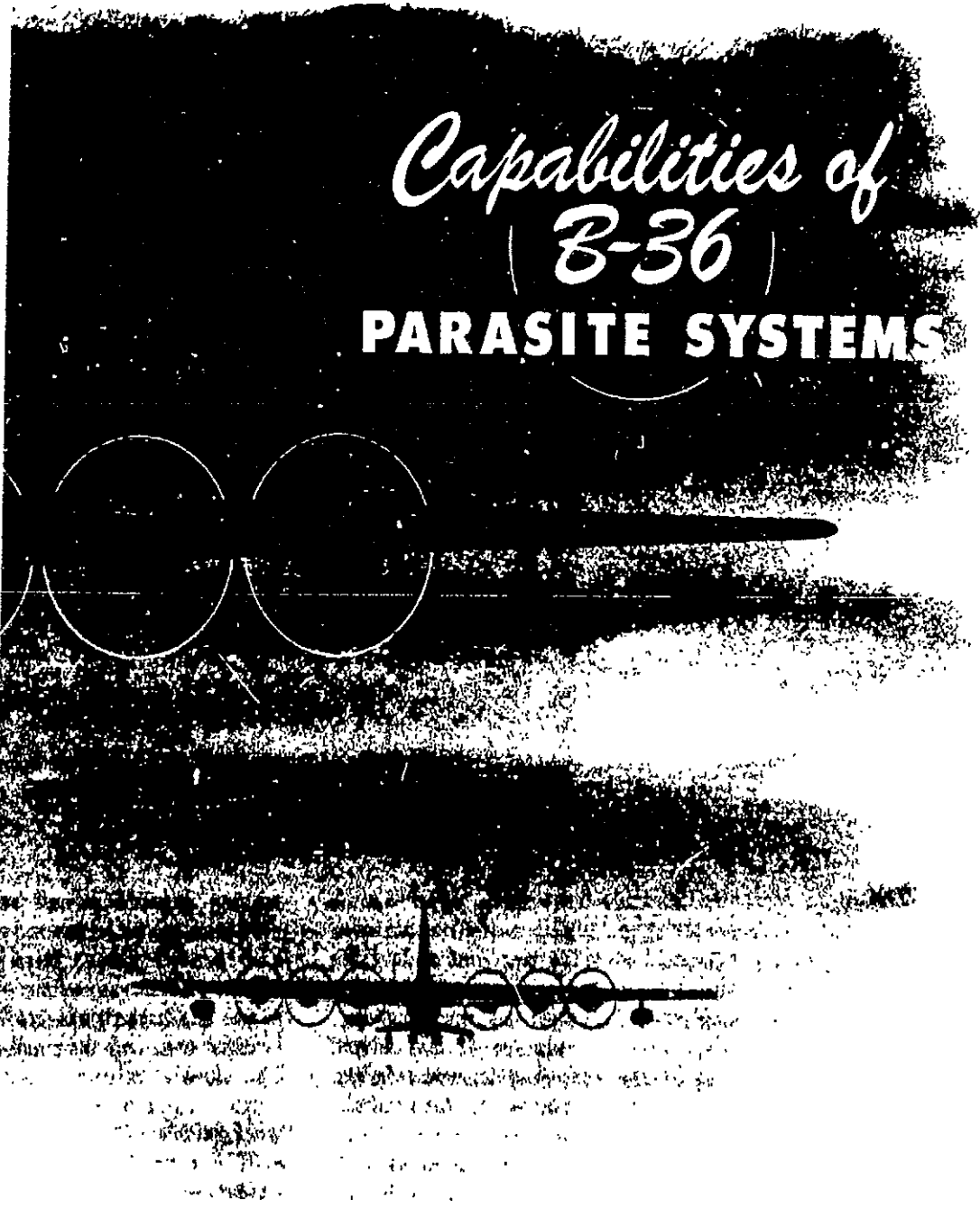
*Capabilities of  
B-36*

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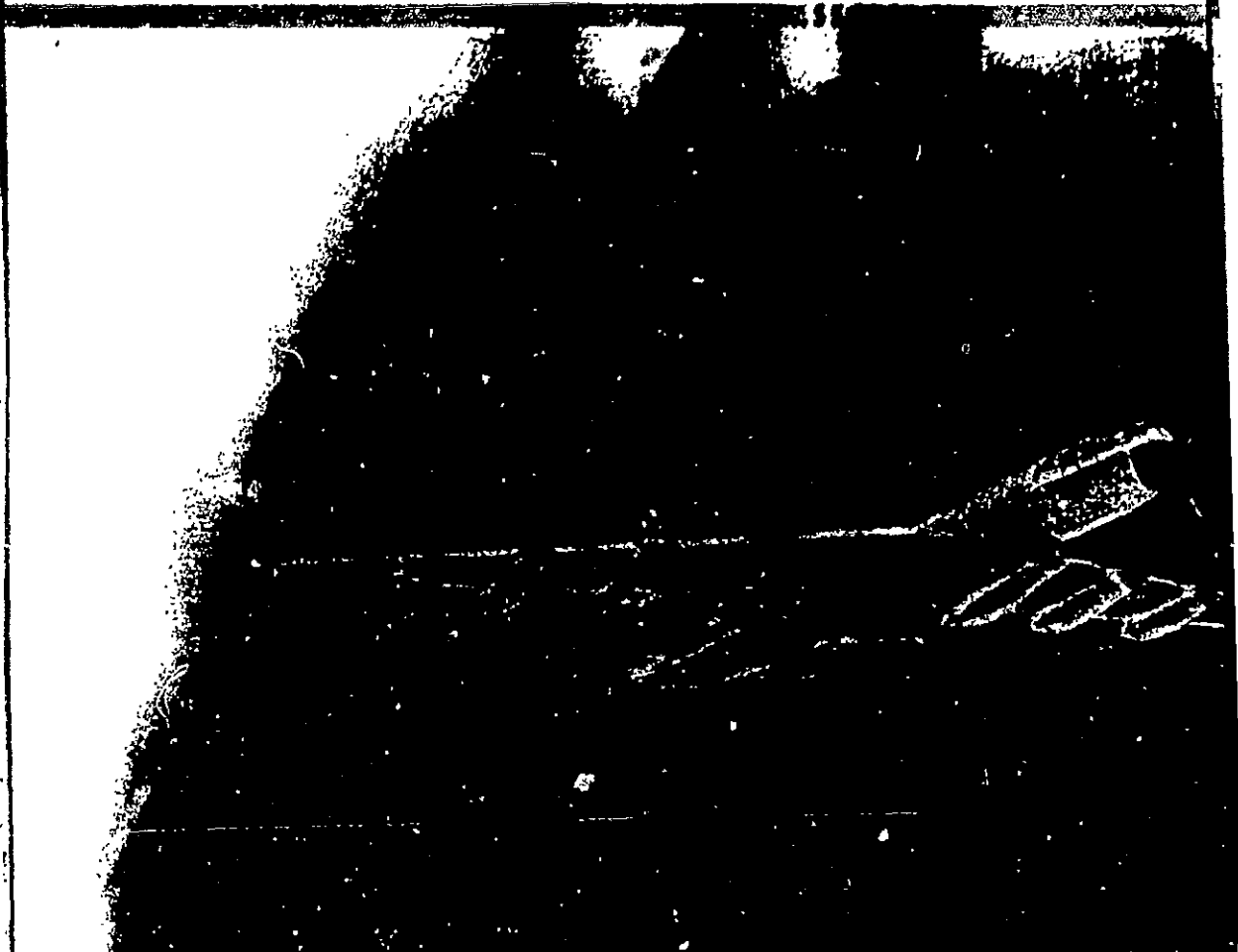


*Capabilities of*  
*(B-36)*

**PARASITE SYSTEMS**

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## FOREWORD

The B-36 Parasite Aircraft System as described in this report is a system which utilizes the combination of a specially equipped B-36 carrier and a parasite aircraft to accomplish a particular mission. By such a system the long range features of the strategic bomber are coupled with the high performance and maneuverability characteristics of a fighter. In the strategic employment of such a system, the inherent design features of each of these components will contribute to provide a weapon capable of striking a long range target with a small, fast, maneuverable fighter suitable for bombing or reconnaissance. On a typical mission the B-36 carrier aircraft, equipped

with a launching and recovery system, reports the parasite toward the target and in most cases, loiteres over the target. After the mission is accomplished, the parasite is retrieved, and the carrier is recovered. The larger, slower, and more expensive carrier is not exposed to the attrition rate where the parasite still contributes its long range extensive airborne equipment in a combined operation.

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## FOREWORD

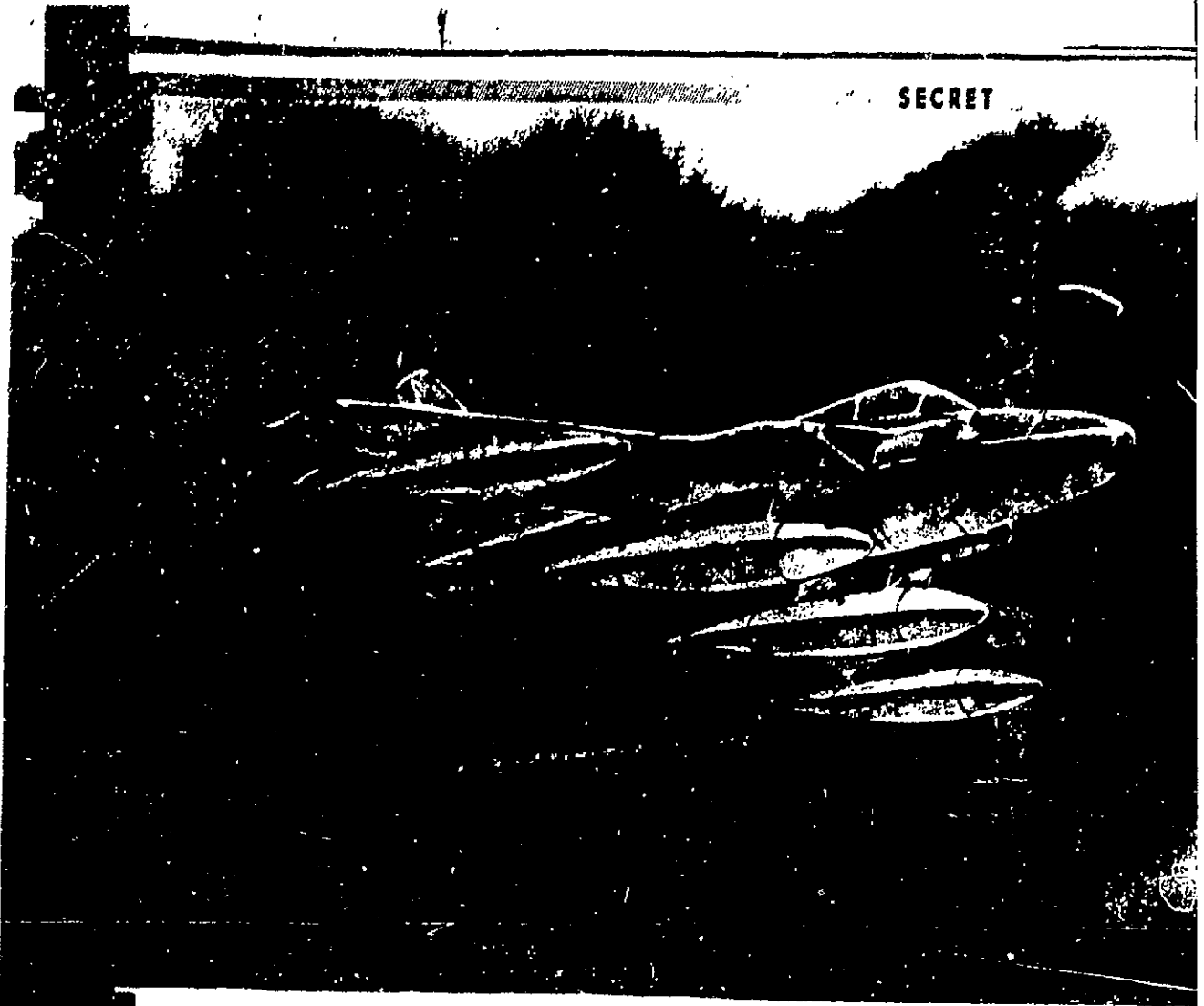
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Aircraft System as described in  
em which utilizes the combination  
pped B-36 carrier and a parasite  
sh a particular mission. By such  
range features of the strategic  
with the high performance and  
characteristics of a fighter. In the  
t of such a system, the inherent  
each of these components will  
a weapon capable of striking a  
with a small, fast, maneuverable  
bombing or reconnaissance. On  
e B-36 carrier aircraft, equipped

with a launching and retrieving mechanism, trans-  
ports the parasite toward enemy territory, launches it,  
and in most cases, loiters while the parasite contin-  
ues toward its specific target; with its mission ac-  
complished, the parasite rendezvous with the carrier,  
is retrieved, and the combination then returns to base.  
The larger, slower, and therefore more vulnerable  
carrier is not exposed to enemy countermeasures  
where the attrition rate would be relatively high, but  
still contributes its long range characteristics and  
extensive airborne equipment facilities to the com-  
bined operation.

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A prototype B-36 parasite system, FICON, has been designed, constructed, and proven feasible by actual flight tests as an RB-36/F-84E bomb bay type parasite system. This prototype system successfully demonstrated the ability to perform the launching and retrieving operations required of a parasite carried in the bomb bay of the carrier.

The size and range of the B-36 make it capable of excellent performance as a parasite carrier. The RF-84F's high performance, coupled with its long

range and high load capacity, make it an excellent available fighter type parasite. The fact that both are existing aircraft in appreciable numbers, make these parasite systems possible at low costs. It is therefore possible to present the tactical capability that employs the B-36 RB-36/F-84E type parasites for reconnaissance missions.

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high load carrying ability, and proven feasible by actual tests. The B-36/F-84E bomb bay type parasite system successfully demonstrates the tactical capabilities of the B-36.

parasites for strategic bombing and reconnaissance missions.

parasite system, FICON, has been demonstrated, and proven feasible by actual tests. The B-36/F-84E bomb bay type parasite system successfully demonstrates the tactical capabilities of a parasite carried in a carrier.

of the B-36 make it capable of being used as a parasite carrier. The performance, coupled with its long

range and high load carrying ability, make it the best available fighter type aircraft for parasite use. The fact that both are existing aircraft, available in appreciable numbers, makes realization of operational parasite systems possible at an early date at low costs. It is therefore the purpose of this report to present the tactical capabilities of a weapons system that employs the B-36 as a carrier which launches RF-84F type parasites for strategic bombing and reconnaissance missions.

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# RECONNAISSANCE

## LOW ALTITUDE



### PHOTO

- Bomb damage assessment.
- Pre-strike intelligence.

### VISUAL

- Target snooping missions
- Enemy defense evaluations

ANCE

# RECONNAISSANCE

# TACTICAL USES OF

TITUDE

HIGH ALTITUDE



assessment.  
intelligence.

ing missions  
se evaluations

## PHOTO

- Pre-strike intelligence
- Bomb damage assessment

## FERRET

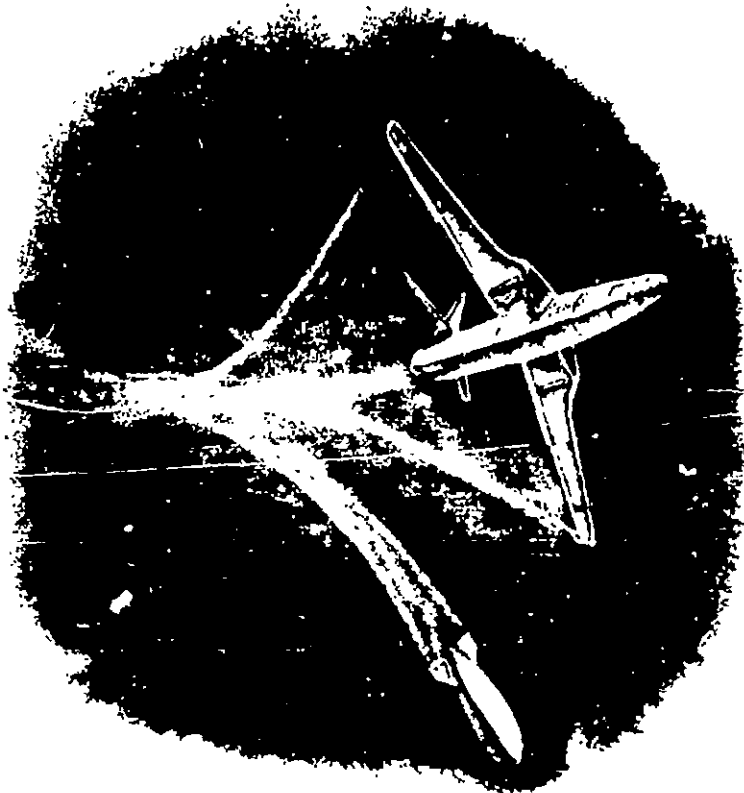
- ECM data collection



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# PARASITE SYSTEM BOMBER

SPEC



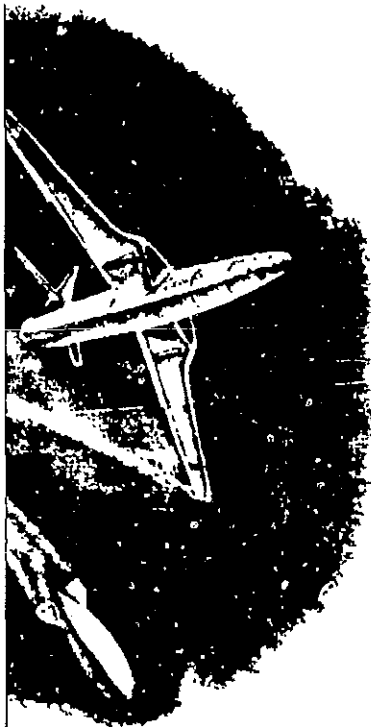
- Atomic weapon strikes
- Harrassing operations

- Wea
- Pla
- Cot
- Dec
- Fig
- Pil
- Psy

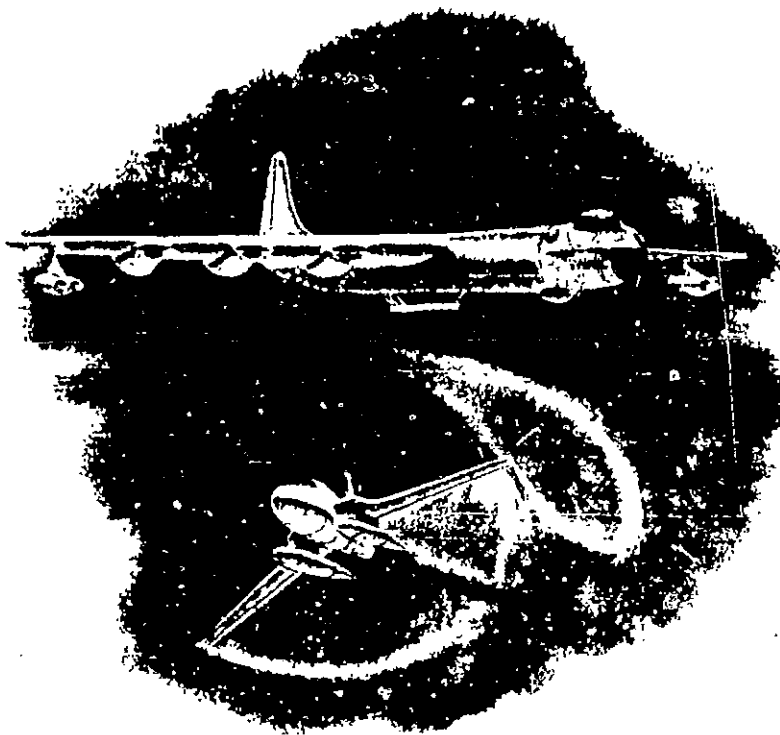
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**STEM  
MBER**

**SPECIAL PURPOSE**



in strikes  
operations



- Weather data collection
- Plant missile beacons
- Courier missions
- Decoy tactics
- Fighter escort
- Pilotless bomber guidance
- Psychological warfare missions

# LAUNCH • AND RETRIEVE • SEQUENCE •



R  
E

STOWED  
POSITION



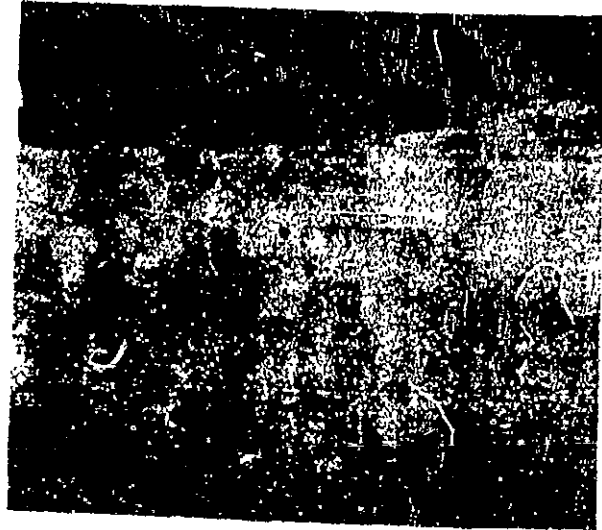
● CONTACT  
POSITION

LATCHED  
POSITION ●



**SECRET**

**LAUNCH •  
AND  
RETRIEVE •  
SEQUENCE •**



**STOWED  
POSITION**



● **CONTACT  
POSITION**



**LATCHED  
POSITION ●**

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SECRET

## DESCRIPTION OF BOMB BAY PARASITE

The type of parasite system presented herein is called a bomb bay type. The parasite, either a bomber or reconnaissance version of the RF-84F, is carried in the bomb bay of a B-36 or RB-36. A trapeze is used to support, launch, and retrieve the parasite during flight. The mechanical principle of this system is illustrated on the opposite page with actual photographs taken during the FICON development program. An F-84E and RB-36F were used for this particular program.

The sequence operation of the trapeze is controlled from the carrier; this control is vested in an operator located in a pressure capsule in the bomb bay of a bomber type carrier or in the camera compartment of a reconnaissance type. Full view of the trapeze and parasite is afforded in either case. The nose coupling of the parasite is operated by the parasite pilot. While the RF-84F is stowed the pilot enjoys the

normal crew compartment and from the pressure capsule, access given to the parasite cockpit is provided.

Operational equipment is provided. The parasite is installed in the carrier for sea level operations for bombing and navigation. Toss Bomb Compartment is provided. These are in equipment section.

The components of the weapons system are either available to the parasite pilot or ordered.

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## PADN OF BOMB BAY PARASITE SYSTEM

crew comfort system presented herein is from the parasite. The parasite, either a version of the RF-84F, is a B-36 or RB-36. A trapeze is used to access the parasite cockpit, and retrieve the parasite. The mechanical principle of this system is detailed on the opposite page with a drawing. During the FICON development and RB-36F were used for the parasite. The trapeze is controlled by an operator in the bomb bay of a B-36. A camera compartment of a system is provided for the parasite pilot. The nose coupling point is provided by the parasite pilot. The parasite pilot enjoys the

normal crew comfort provisions of the carrier; access to and from the parasite is made via a portable oxygen bottle, access platform, and safety harness. The parasite cockpit is heated while stowed.

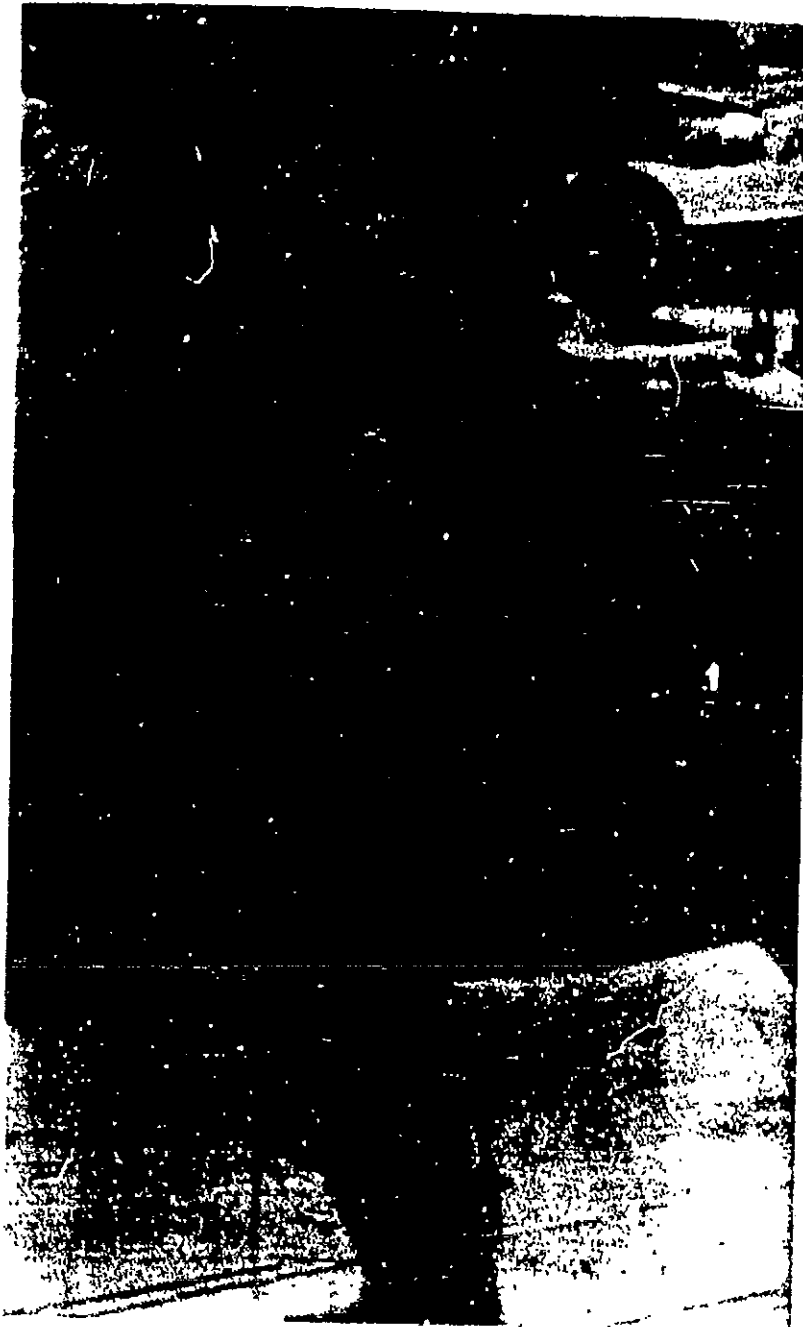
Operational equipment for two-stage type missions are provided. Rendezvous (or homing) and IFF equipment is installed in the carrier and parasite. The sea level operation of the parasite demands special bombing and navigation equipment; for this purpose a Toss Bomb Computer and Ground Position indicator is provided. These equipments are more fully discussed in equipment section.

The components considered for the initial parasite weapons systems are aircraft and equipments which are either available now or are developed and proven to the point where immediate production can be ordered.

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19 JANUARY 1951

31 MARCH 1951

1 MAY 1951

20 NOVEMBER 1951

9 JANUARY 1952

23 APRIL 1952

14 MAY 1952

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SECRET

## HISTORY & STATUS

### FICON HIGHLIGHTS

- 1951
- 19
- 1951
- 52
- 19 JANUARY 1951
- Contract awarded for prototype FICON system composed of RB-36F and F-84E (MX-1602)
- 31 MARCH 1951
- Exploratory flight test program completed with F-84E & YF-84F to evaluate flight conditions under bomb bay area of RB-36D.
- 1 MAY 1951
- Mockup Board Inspection.
- 20 NOVEMBER 1951
- AMC Safety Board Inspection.
- 9 JANUARY 1952
- First contact flight - Separate take-off and landing.
- 23 APRIL 1952
- First retrieve & launch operation with complete retraction.
- 14 MAY 1952
- First composite flight with F-84E stored in bomb bay during take-off and landing.

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# OF CONVAIR PARASITE SYSTEM WOR

29 MAY 1952

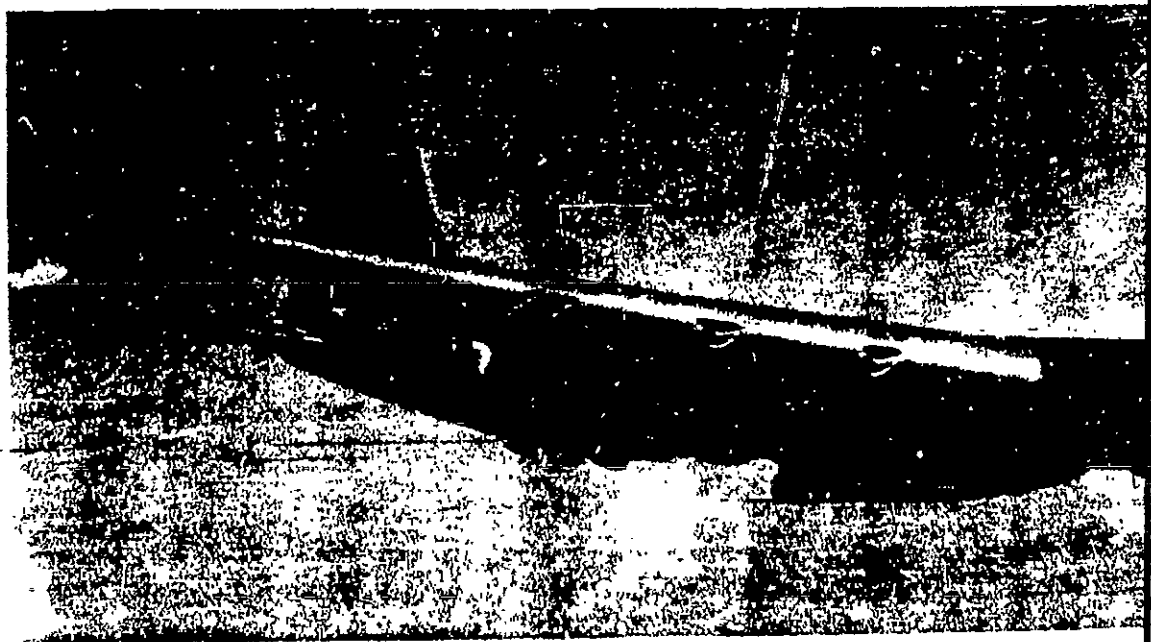
Phase II flight tests completed. 68  
aerial launch and retrieve operations  
completed during 36.8 flight hours.

15 OCTOBER 1952

20 FEBRUARY 1953

12 SEPTEMBER 1952

Additional 25 hours of flight testing  
completed including USAF pilot train-  
ing and system improvements.



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# VORPARASITE SYSTEM WORK

1952  
All flight tests completed. 68  
launch and retrieve operations  
completed during 36.8 flight hours.

15 OCTOBER 1952

Composite RB-36F/F-94E delivered to  
APG for evaluation tests.

MAY 1953

Total 25 hours of flight testing  
completed including USAF pilot train-  
ing and system improvements.

20 FEBRUARY 1953

Total 280 hours of flight during which  
170 aerial launch and retrieve oper-  
ations were completed including night  
flights, 30,000 ft. contacts, indoctrin-  
ation of eight parasite pilots, and long  
range missions.

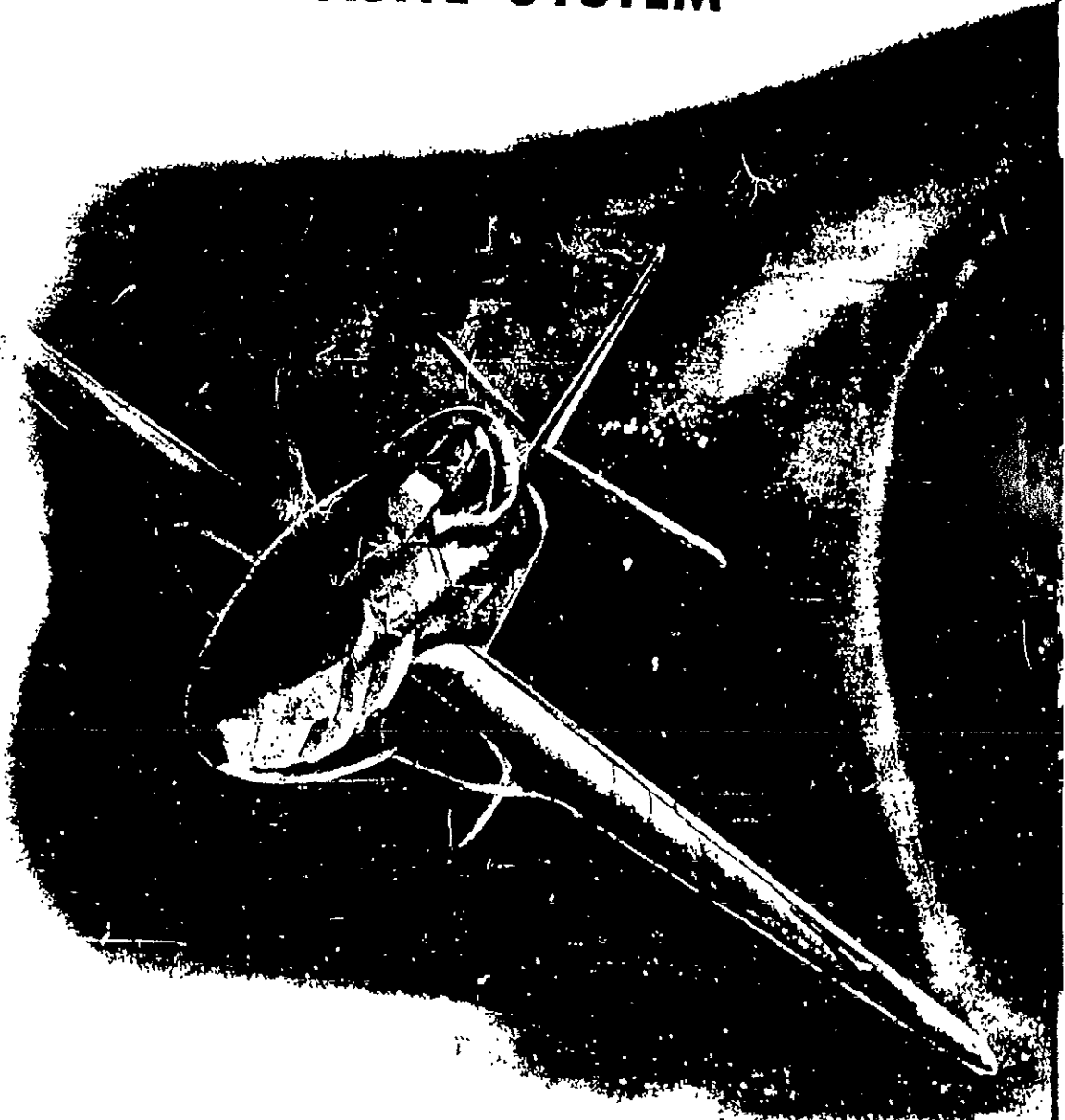


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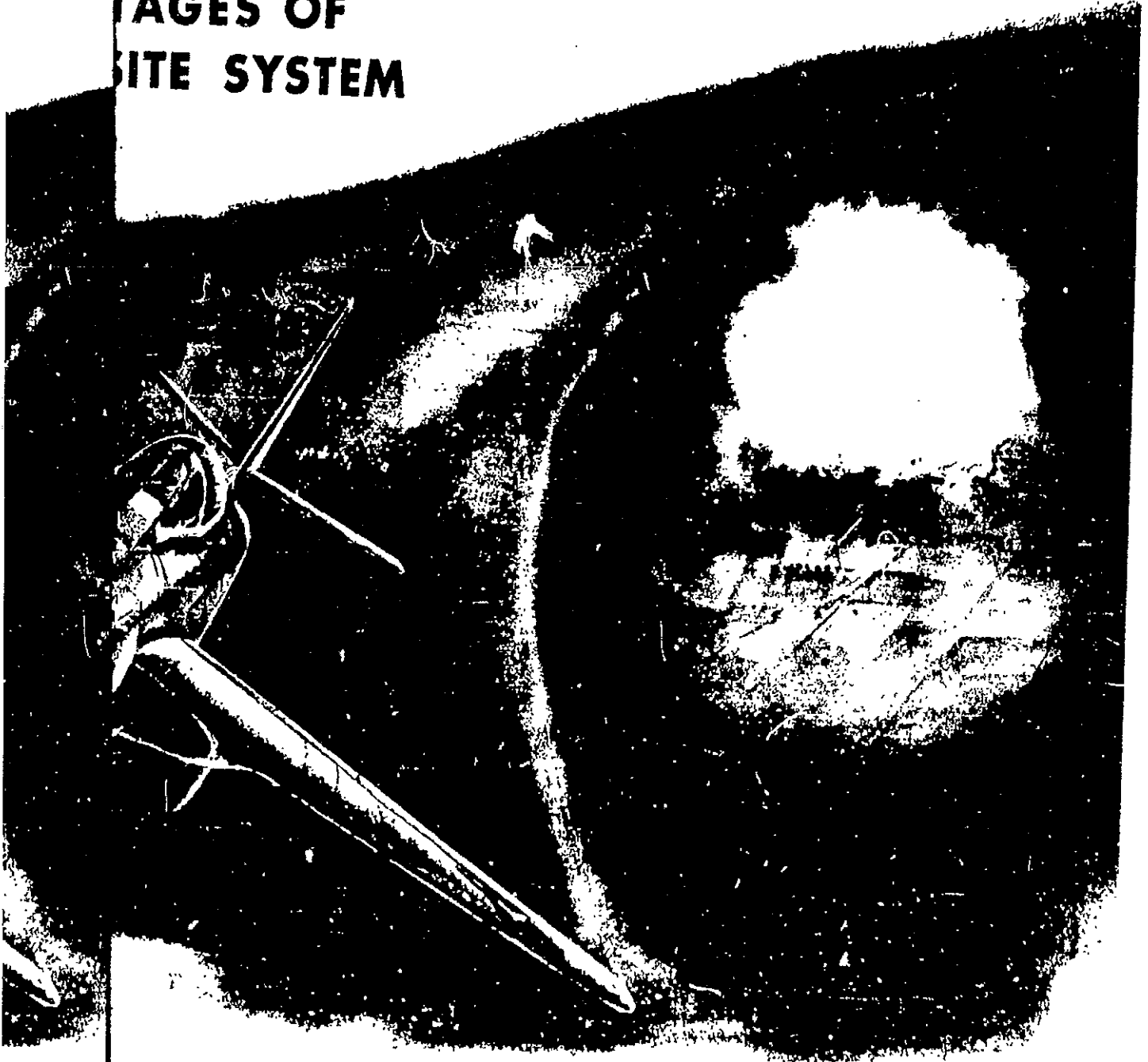
# ADVANTAGES OF THE PARASITE SYSTEM



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# STAGES OF SITE SYSTEM



ET

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**HIGH PROBABILITY OF MISSION SUCCESS**

- High speed over target
- Low vulnerability to detection and interception
- Sea level penetration.

**ADDED CAPABILITY**

- Extended total mission radius
- Low altitude capability
- Extensive alternate use

**MINIMUM PERSONNEL AND EQUIPMENT**

- Small single place parasite plane
- Carrier remains outside of early warning range

**EXTENDED UTILITY OF EXISTING SYSTEMS**

- Minimum development
- Early procurement
- Low cost
- Minimum crew indoctrination

**SIMPLE TWO STAGE SYSTEM**

- Minimum pilot fatigue
- Single rendezvous and contact at same range
- One carrier vs 4-5 tankers

**SECURITY INFORMATION - SECRET**

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MISSION SUCCESS

get  
detection a  
n.

HIGH PROBABILITY OF MISSION SUCCESS

- High speed over target
- Low vulnerability to detection and hits.
- Sea level penetration.

ion radius  
lity  
use

ADDED CAPABILITY

- Extended total mission radius
- Low altitude capability
- Extensive alternate use

MINIMUM EQUIPMENT

parasite penet  
side of early

MINIMUM PERSONNEL AND EQUIPMENT EXPOSED TO ENEMY DEFENSES

- Small single plane parasite penetrates target area
- Carrier remains outside of early warning radar perimeter

EXISTING

nt  
strination

EXTENDED UTILITY OF EXISTING AIRCRAFT

- Minimum development
- Early procurement
- Low cost
- Minimum crew indoctrination

SYSTEM

ue  
and contact  
tankers

SIMPLE TWO STAGE SYSTEM

- Minimum pilot fatigue
- Single rendezvous and contact vs 4-5 for IFR at same range
- One carrier vs 4-5 tankers

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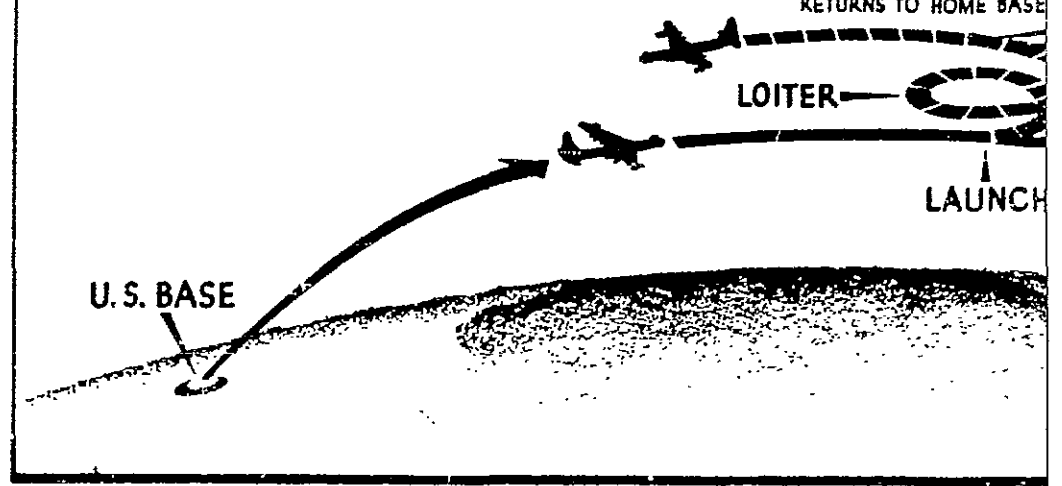
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# TYPES OF PARASITE

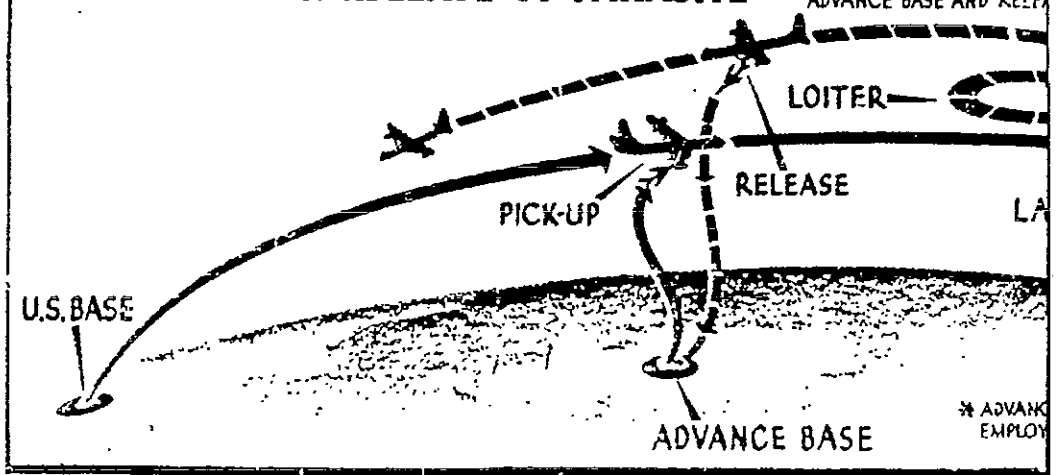
## 1 • BASIC RADIUS

FROM TAKE-OFF AT U.S. B  
RELEASES IT AND LOITER  
MISSION AND RETURNS T  
RETURNS TO HOME BASE



## 2 • RADIUS WITH ADVANCE BASE PICK-UP & RELEASE OF PARASITE\*

B-36 TAKES OFF FROM U.S. BA  
EDGE OF COMBAT ZONE, R  
PERFORMS ITS MISSION AN  
ADVANCE BASE AND RELEA



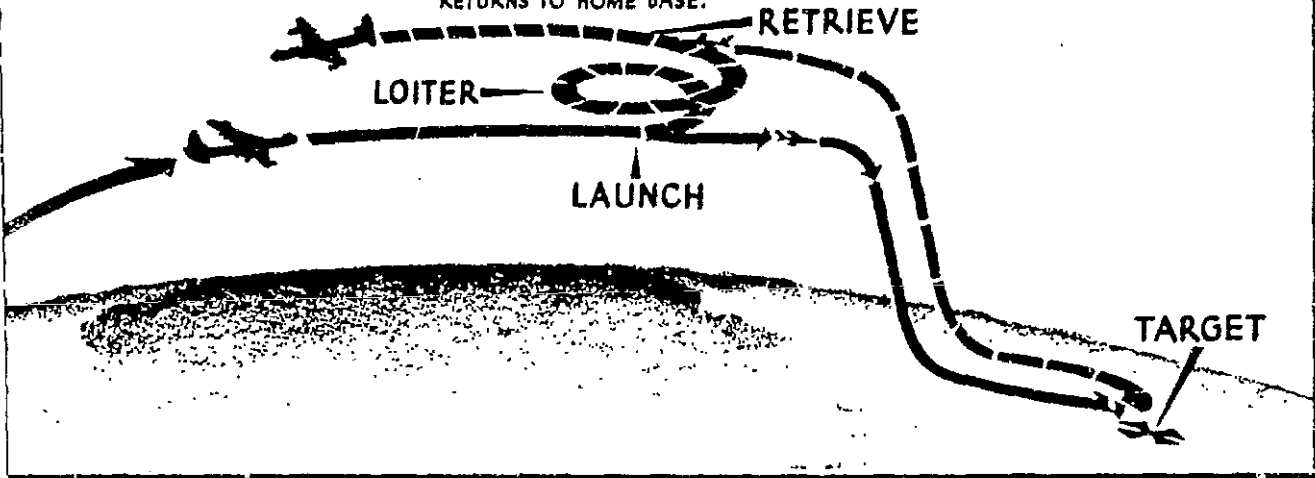
\* ADVANCE  
EMPLOY

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# TYPES OF PARASITE MISSIONS

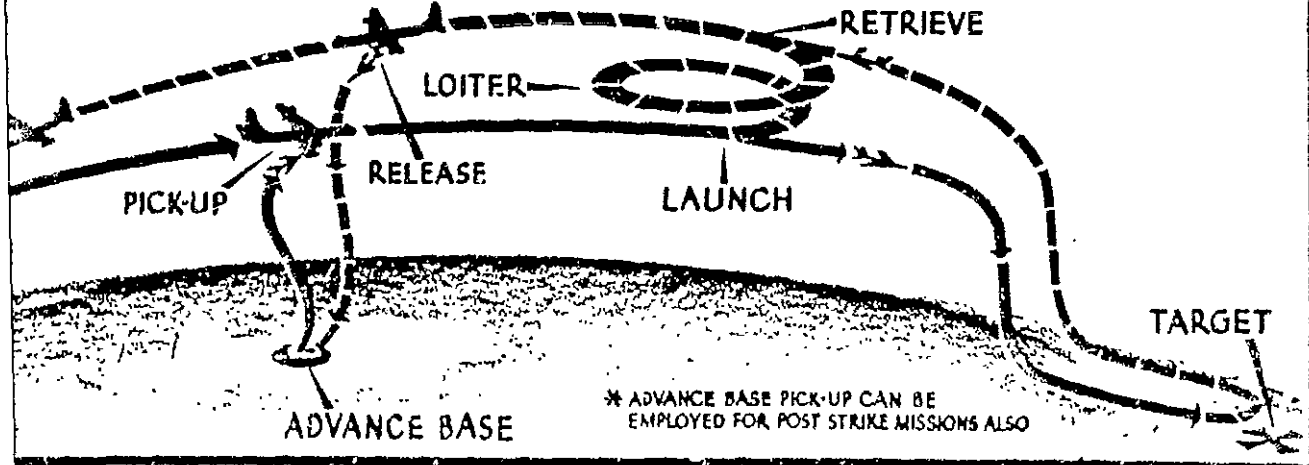
US

FROM TAKE-OFF AT U.S. BASE, B-36 CARRIES PARASITE TO EDGE OF COMBAT ZONE, RELEASES IT AND LOITERS; PARASITE PROCEEDS TO TARGET, PERFORMS ITS MISSION AND RETURNS TO B-36 FOR RETRIEVING. COMPOSITE AIRCRAFT RETURNS TO HOME BASE.



## ADVANCE BASE RELEASE OF PARASITE \*

B-36 TAKES OFF FROM U.S. BASE, PICKS UP PARASITE OVER ADVANCE BASE, CARRIES IT TO EDGE OF COMBAT ZONE, RELEASES IT AND LOITERS. PARASITE PROCEEDS TO TARGET, PERFORMS ITS MISSION AND RETURNS TO B-36 FOR RETRIEVING, IS CARRIED OVER ADVANCE BASE AND RELEASED; B-36 CONTINUES ON TO HOME BASE.

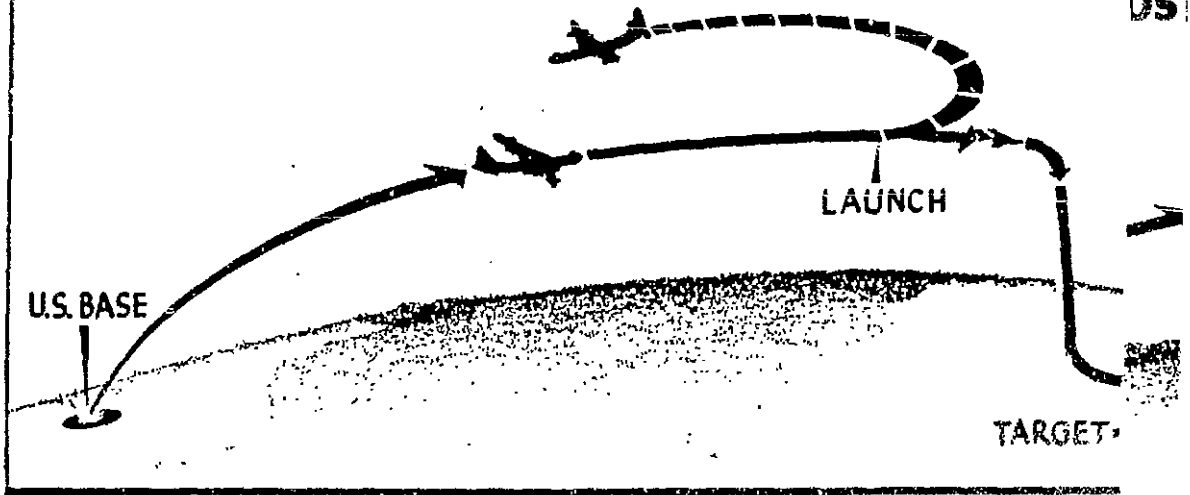


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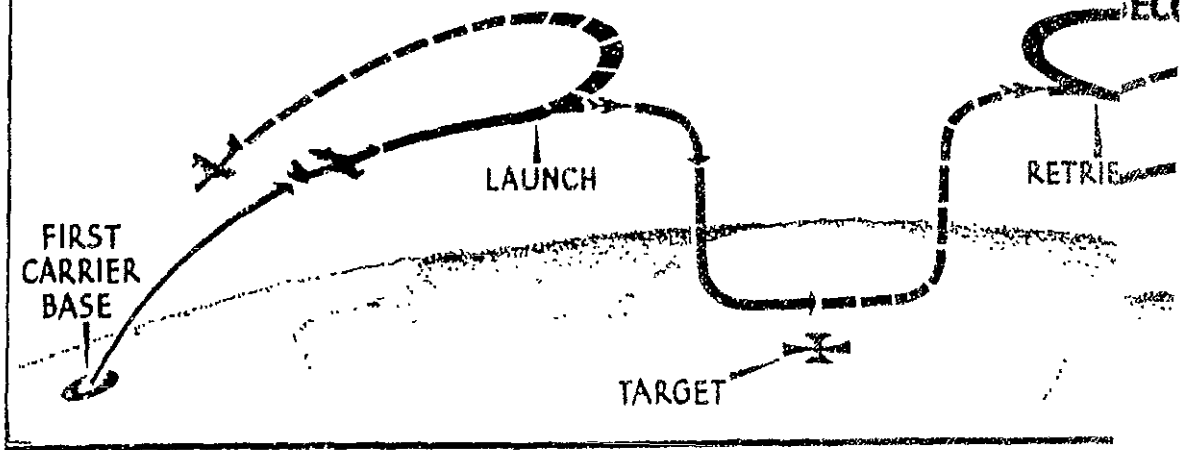
### 3 • PARASITE POST STRIKE STAGE

FROM TAKE-OFF AT U.S. BASE, B-36 RELEASES IT AND RETURNS TO HOME ZONE, PERFORMS ITS MISSION AND RETURNS TO TARGET, PERFORMS ITS MISSION AND RETURNS TO TARGET, PERFORMS ITS MISSION AND RETURNS TO TARGET.



### 4 • PARASITE POST STRIKE RETRIEVE BY SECOND CARRIER

FROM TAKE-OFF AT U.S. BASE, B-36 RELEASES IT AND RETURNS TO HOME ZONE, PERFORMS ITS MISSION AND CONTINUES ON TO SECOND CARRIER AND RETRIEVE BY SECOND B-36.

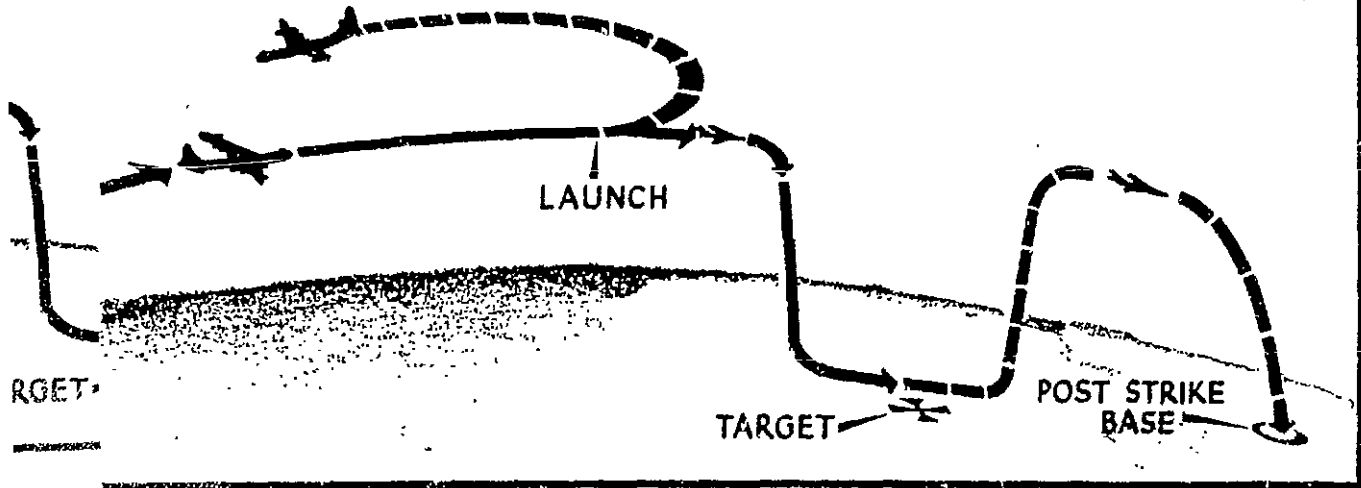


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BASE, B-36  
RETURN TO HOME  
MISSILE

### POST STRIKE STAGE

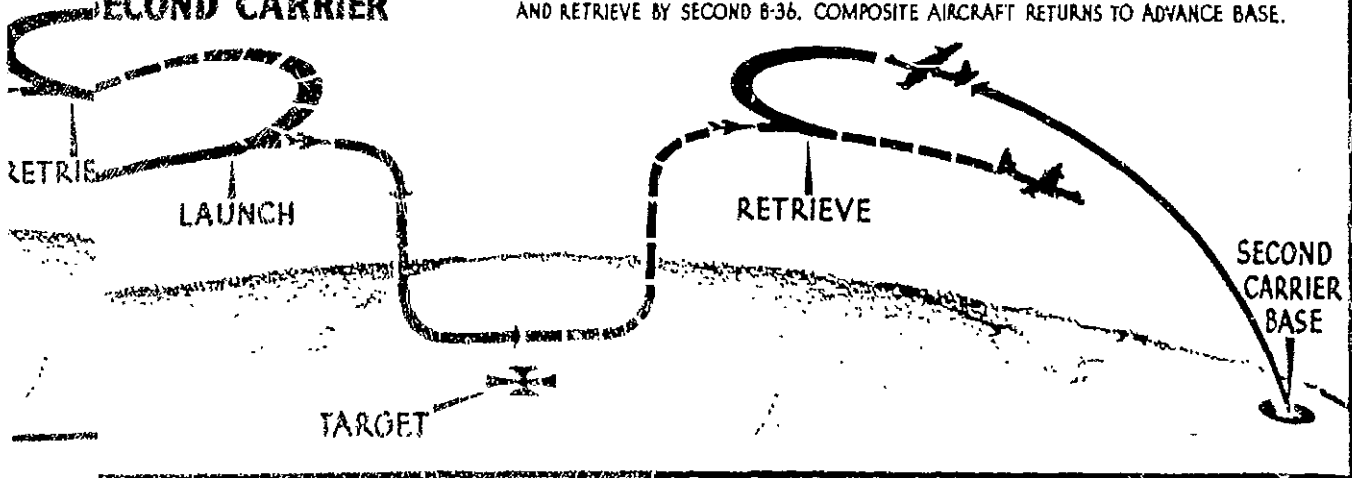
FROM TAKE-OFF AT U.S. BASE, B-36 CARRIES PARASITE TO EDGE OF COMBAT ZONE, RELEASES IT AND RETURNS TO HOME BASE; PARASITE PROCEEDS TO TARGET, PERFORMS ITS MISSION AND CONTINUES TO POST STRIKE BASE.



BASE, B-36  
RETURN TO HOME  
COMPOSITE AIRCRAFT  
B-36, C-119

### POST STRIKE SECOND CARRIER

FROM TAKE-OFF AT U.S. BASE, B-36 CARRIES PARASITE TO EDGE OF COMBAT ZONE, RELEASES IT AND RETURNS TO HOME BASE; PARASITE PROCEEDS TO TARGET, PERFORMS ITS MISSION AND CONTINUES ON TO OPPOSITE EDGE OF COMBAT ZONE FOR RENDEZVOUS AND RETRIEVE BY SECOND B-36. COMPOSITE AIRCRAFT RETURNS TO ADVANCE BASE.



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## PERFORMANCE

The range capabilities of the B-36 Parasite System can best be understood by projecting actual missions on a global map. The physical significance of the missions described on the preceding pages is illustrated on the following maps. The major target areas and the corresponding early warning radar perimeter are indicated on each map.

The carrier portion of each type of mission is flown at the maximum range altitude with a cruise climb of approximately 150 nautical miles to the launch point at 25,000 ft. The loiter and retrieve are made at this same altitude. The carrier radius shown is with a bomber type airplane stripped of combat equipment (except for tail turret) at a Take-Off Gross Weight of 410,000 lbs.

The combat zone for the parasite is a 100 nautical

mile radius at combat zone is combat zone a strike is flown parasite is either photo equipment The variation in radius between they are shown

It may be noted the carrier radius early warning perimeter being penetrated avoided by skirting with sufficient speed to reach its target

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## PERFORMANCE

radius at  
zone is

zone of the B-36 Parasite System  
is flown projecting actual missions  
is of physical significance of the  
equipment preceding pages is illus-  
tration of. The major target areas  
between warning radar perimeter  
are shown

be noted type of mission is flown  
carrier remains with a cruise climb of  
warning perimeter miles to the launch point  
penetrated retrieve are made at this  
radius shown is with a  
sufficient speed of combat equipment  
is target Take-Off Gross Weight of

Parasite is a 100 nautical

mile radius at sea level. The target speed in this  
combat zone is  $M = .86$ . The flight from launch to  
combat zone and combat zone to retrieve or post  
strike is flown at maximum range cruise altitude. The  
parasite is either a reconnaissance with 600 lbs. of  
photo equipment or a bomber with a 3500 lb. bomb.  
The variation in carrier radius, and total mission  
radius between each type of parasite is so small  
they are shown as one.

It may be noted on the Basic Radius Missions that  
the carrier remains outside or on the fringe of the  
early warning perimeter. The majority of that shown  
being penetrated on the Post Strike Mission may be  
avoided by skirting the early warning radar perimeter  
with sufficient range remaining for the parasite to  
reach its targets.

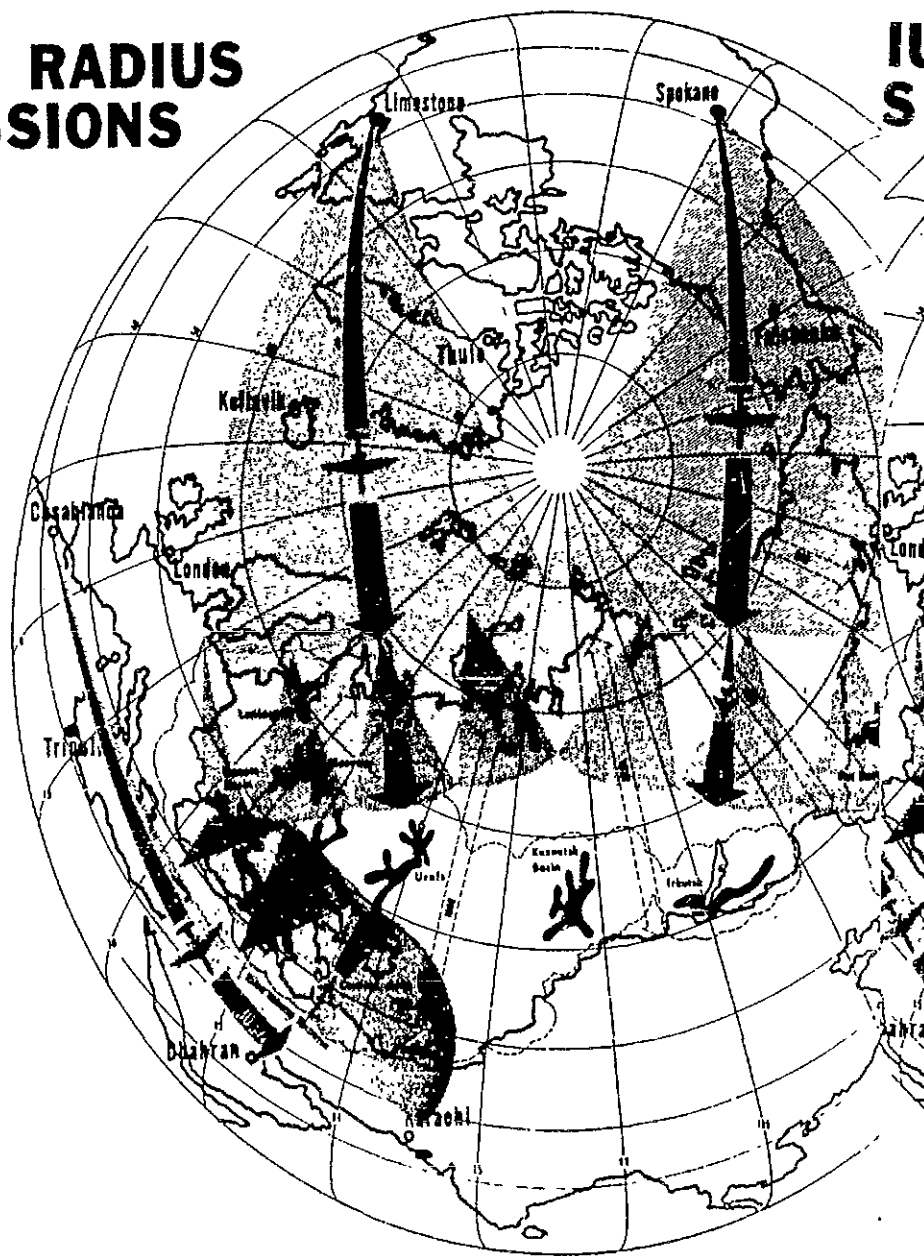
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# BASIC RADIUS MISSIONS

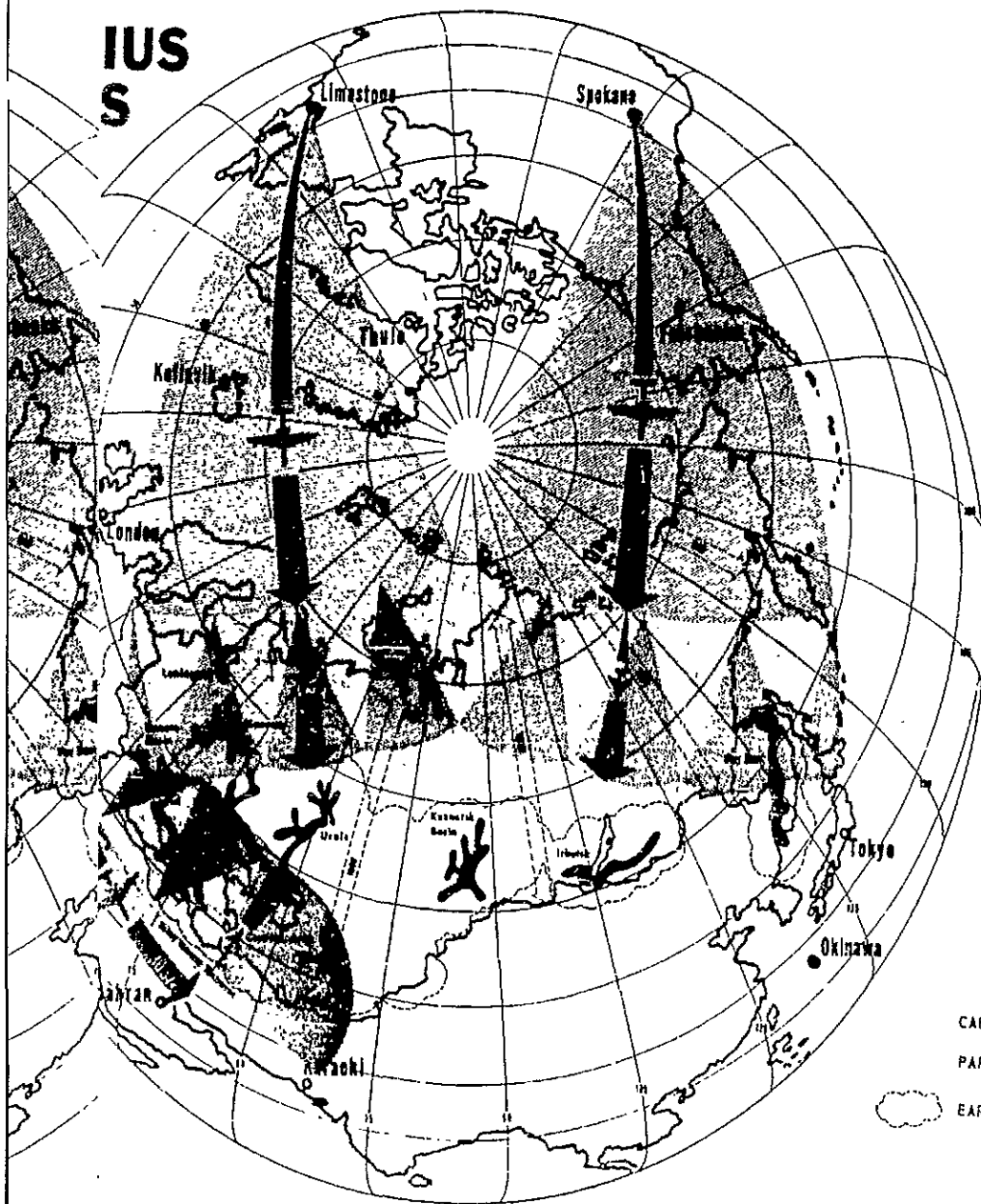
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CARRIER RADIUS

PARASITE RADIUS

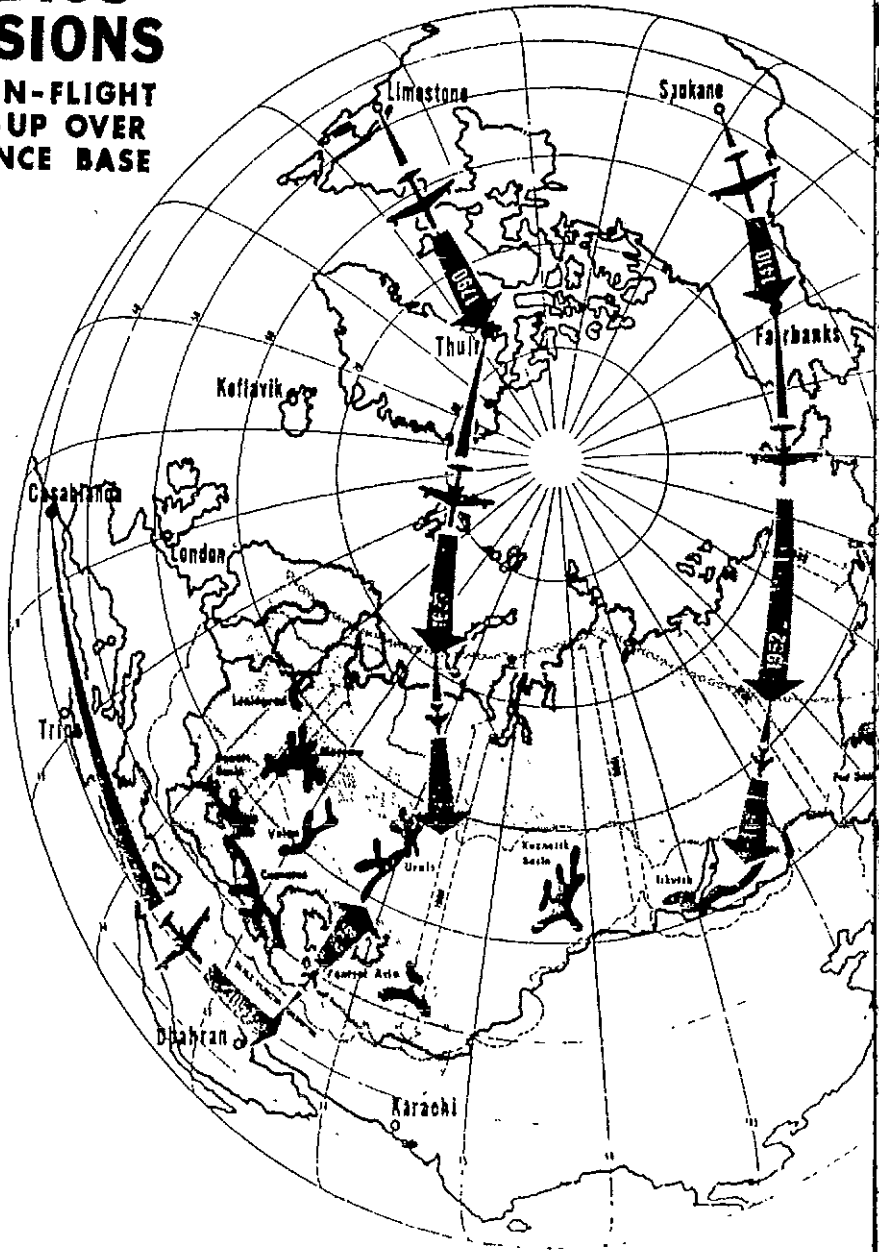
EARLY WARNING PERIMETER

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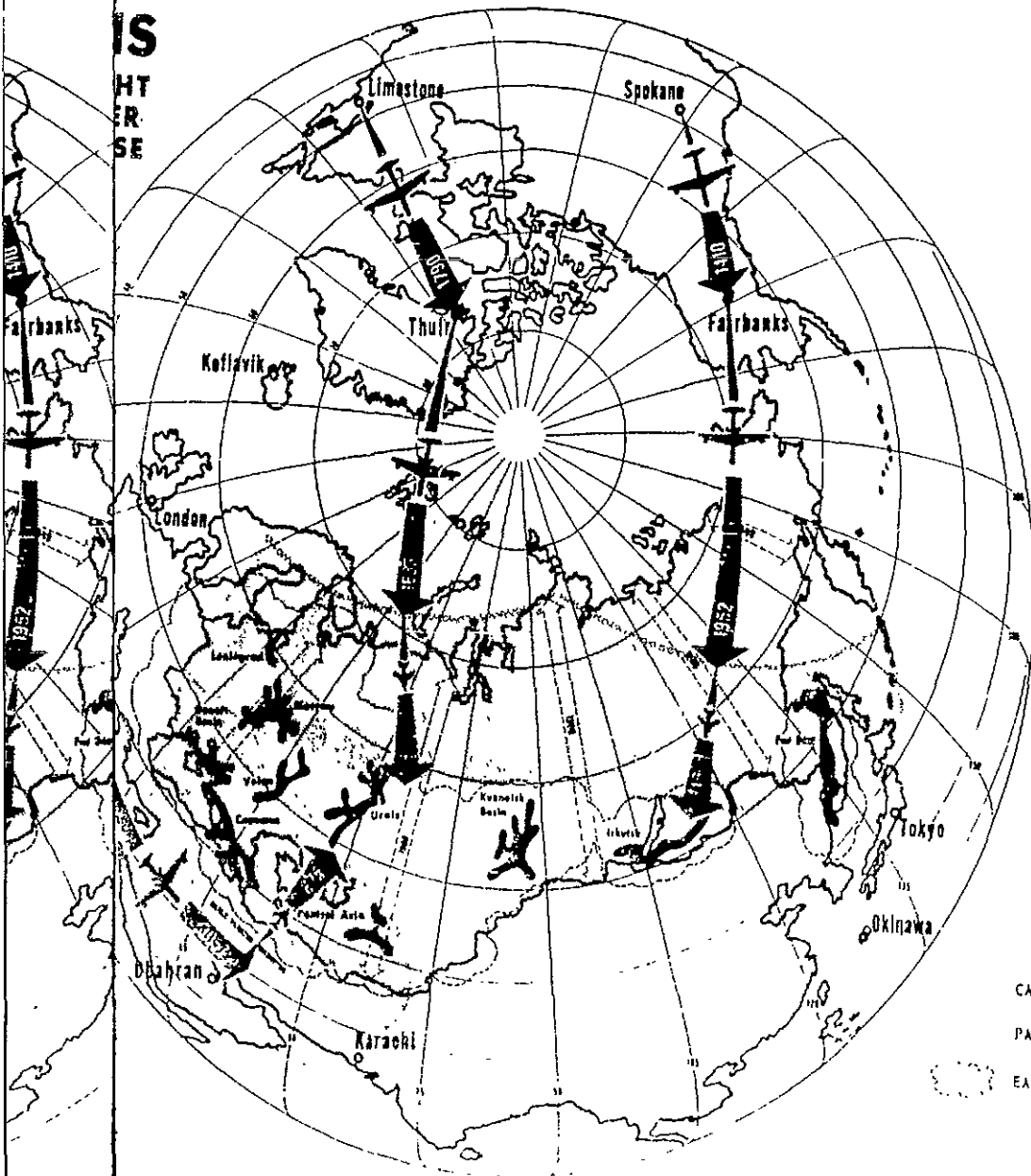
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**RADIUS  
MISSIONS**  
WITH IN-FLIGHT  
PICK-UP OVER  
ADVANCE BASE



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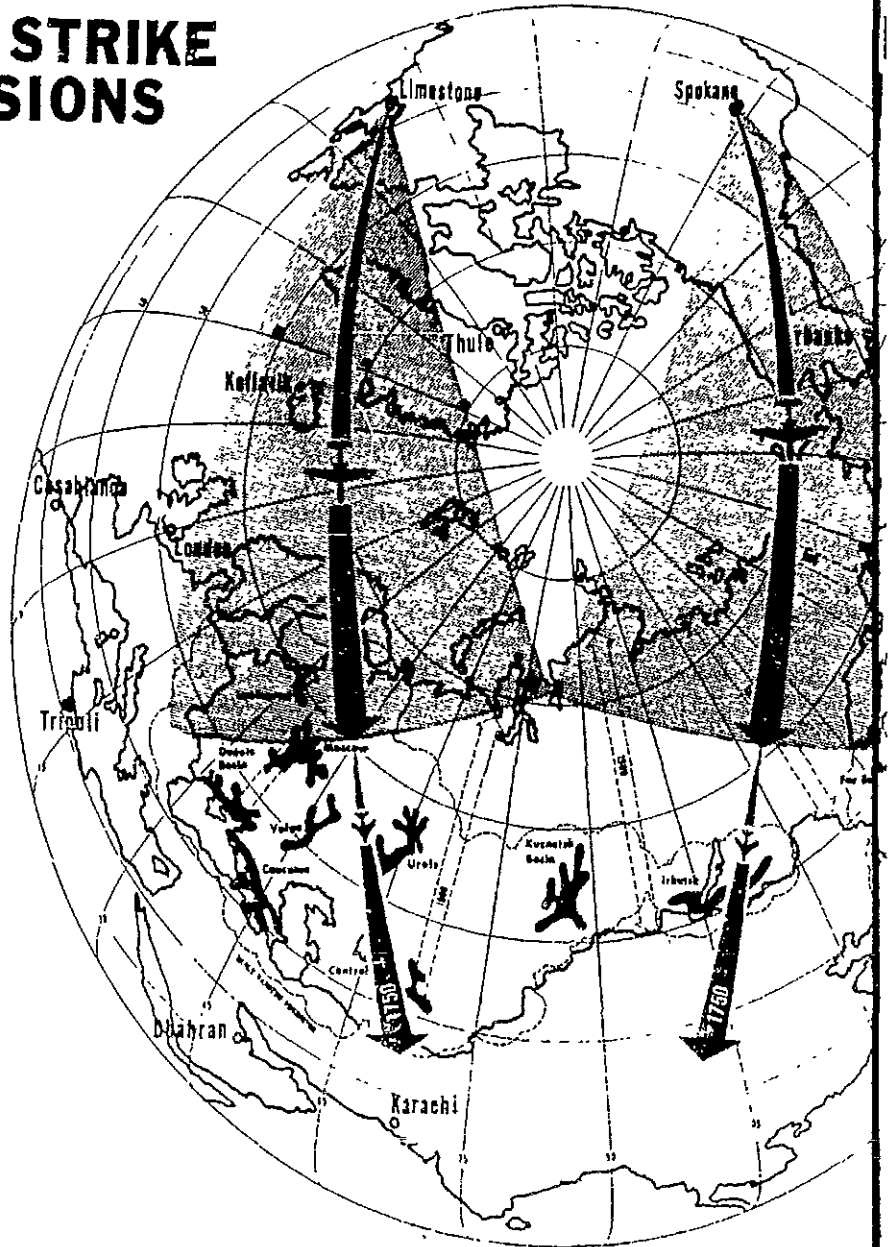
CARRIER RADIUS  
PARASITE RADIUS  
EARLY WARNING PERIMETER

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# POST STRIKE MISSIONS

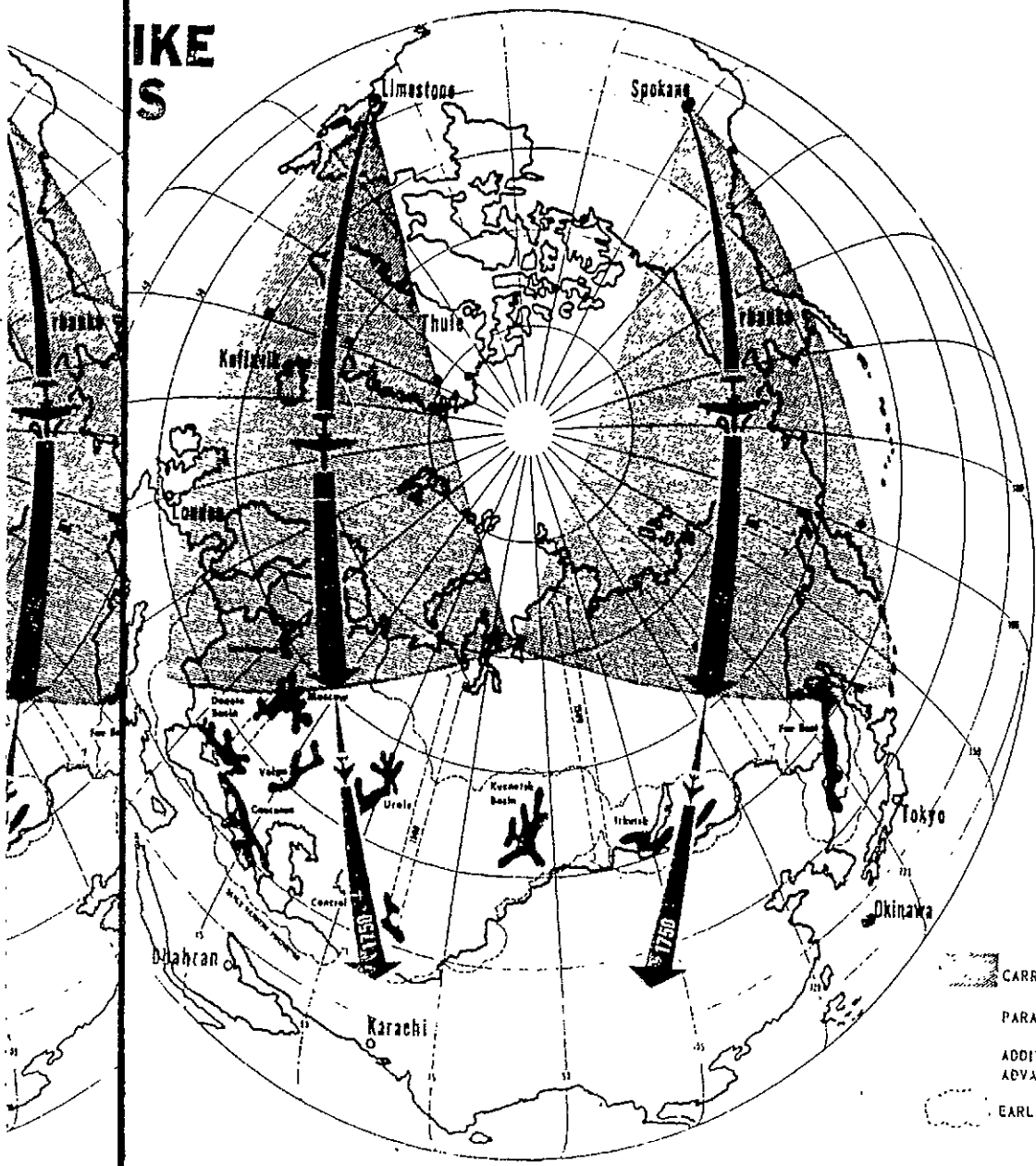






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-  CARRIER RADIUS
-  PARASITE RANGE
-  ADDITIONAL RANGE WITH ADVANCE BASE PICKUP
-  EARLY WARNING PERIMETER

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## RANGE CAPABILITY

The map on the opposite page presents global distances from the two operational U.S. bases considered previously. This map shows those areas nearest Limestone and those more efficiently covered from Spokane, and includes the percentage of targets reached with any radius. Target coverage may be evaluated by comparing range requirements from such a map with weapon range capabilities.

Charts on the following pages summarize the strategic range capabilities of the B-36/F-84 Parasite System for both radius and post strike missions. Data are shown for bombing and reconnaissance missions, and include the effect of sea level zone and parasite pick-up radius on target and total range.

Since the charts present carrier and parasite contributions to system range, these performance capabilities may be compared with range requirements from global maps of all bases to determine system target coverage. For example, suppose it is desired to bomb a target in the Donets Basin area with RF-84F's based 2000 miles away in Keflavik, using B-36's based in Limestone. The distance from Limestone to

Keflavik is  
chart it is s  
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from the tar  
150 n. mi.  
carrier fuel  
RF-84F could  
fly a 460 n.  
miles to ren  
Casablanca;  
the target, fl  
ceed 1150 mi  
If the parasite  
of course, the  
half capacity  
release the pl  
defense area  
radius to anc  
radius.

Similar comp  
requirements  
provides suff  
tential enemy

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MILITARY

## RANGE CAPABILITIES

Keflavik is part of the defense area. The distance from Limestone to Keflavik is 1950 n. mi. From the radius mission chart it is seen that the parasite could be released outside the early warning radar network, 800 miles from the target, and fly a sea level zone radius of 150 n. mi. This mission would not require a full carrier fuel load. It is interesting to note that the RF-84F could be launched 800 miles from the target, fly a 460 n. mi. zone at sea level and proceed 500 miles to rendezvous with a second carrier based in Casablanca; or it could be released 600 miles from the target, fly a 200 mile zone at sea level and proceed 1150 miles from the target to Tripoli for staging. If the parasite and carrier were based in Casablanca, of course, this target would require only about one-half capacity fuel load for the carrier which could release the parasite, loiter and rendezvous outside the defense area, allowing the bomber to fly a 500 mile radius to and from the target, with a 330 mile zone radius.

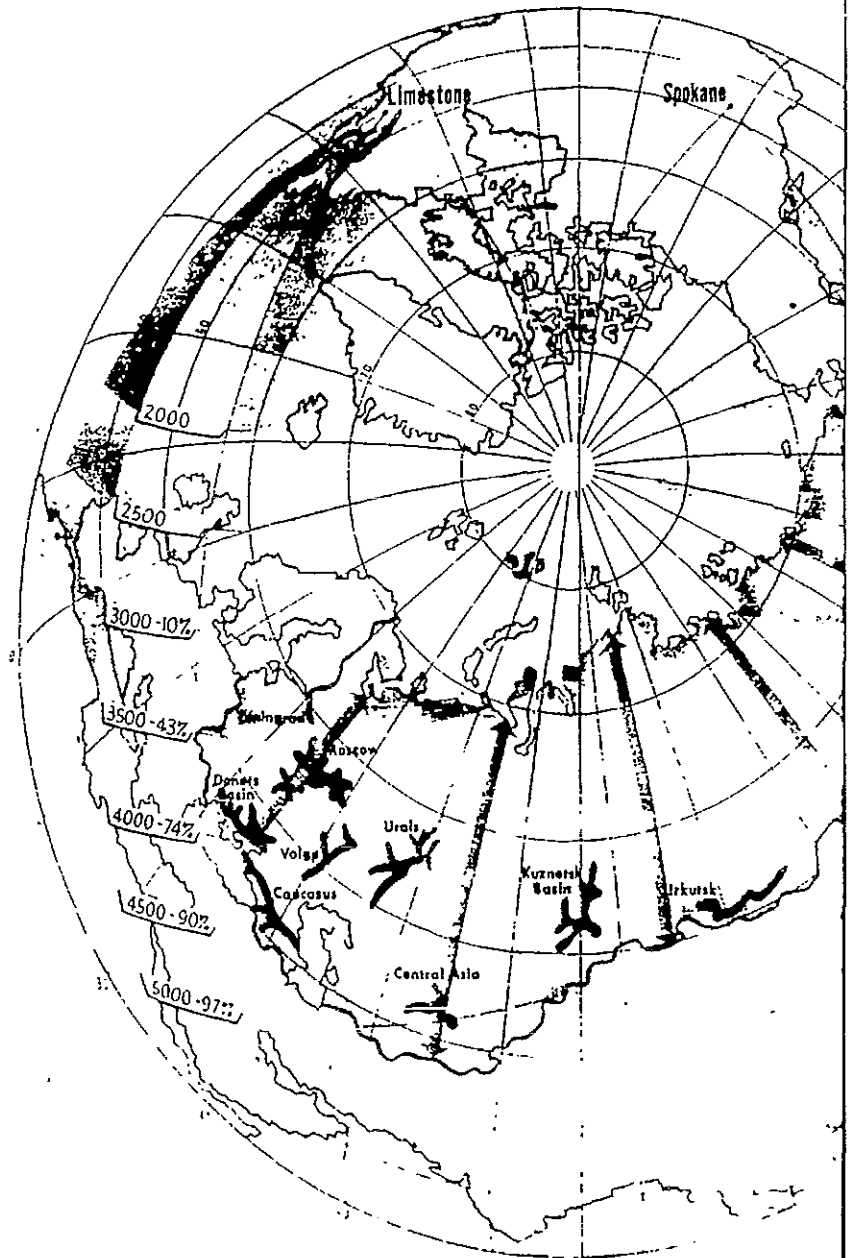
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Similar comparisons of range capabilities with target requirements clearly indicate that this parasite system provides sufficient range to cover a majority of potential enemy targets.

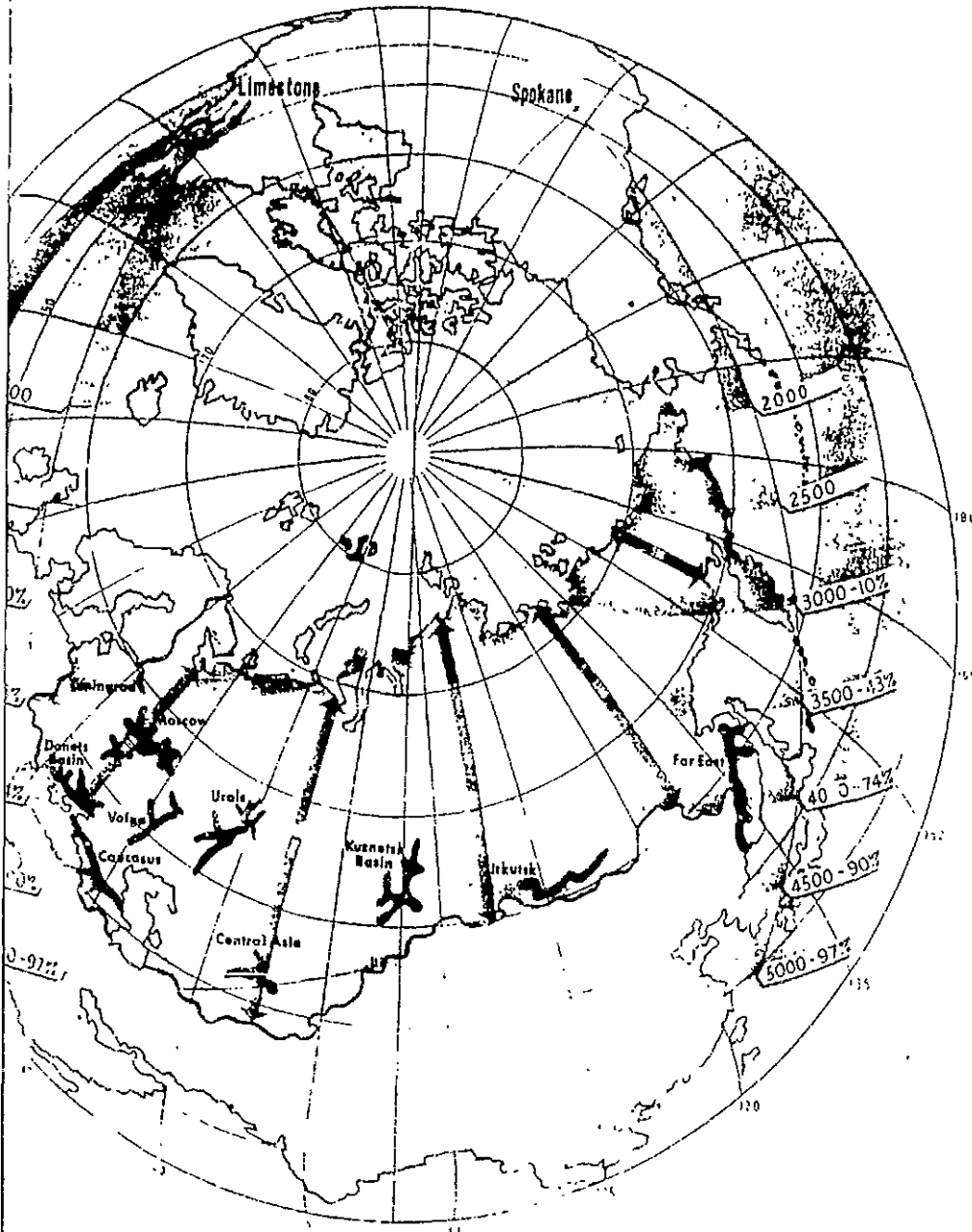
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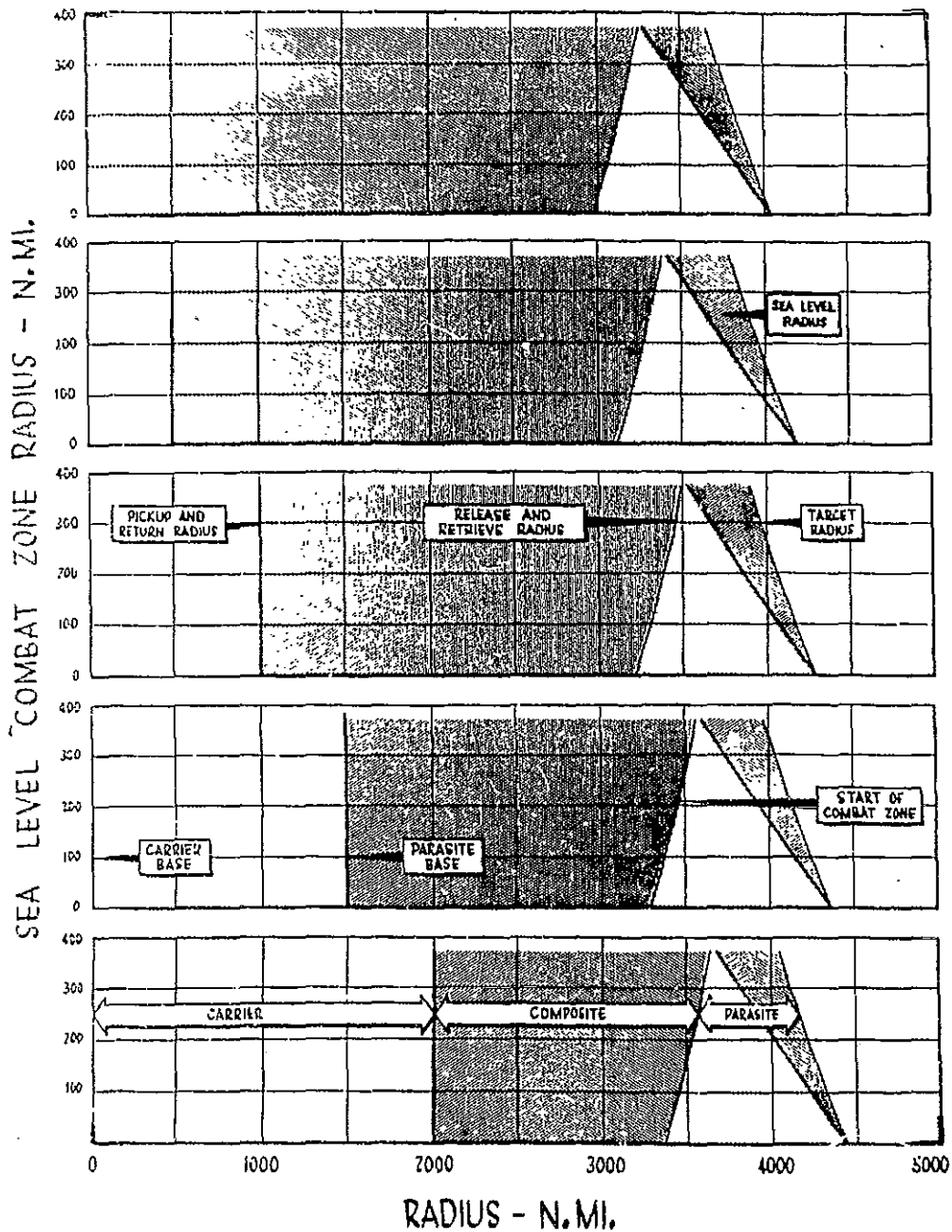


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# B-36 PARASITE SYSTEM RANGE CAPABILITIES

## RECONNAISSANCE RADIUS MISSION

B-36J-CF (STRIPPED) CARRIER - 410,000 LB GR.WT.  
RF - 84F (HEAVY) PARASITE



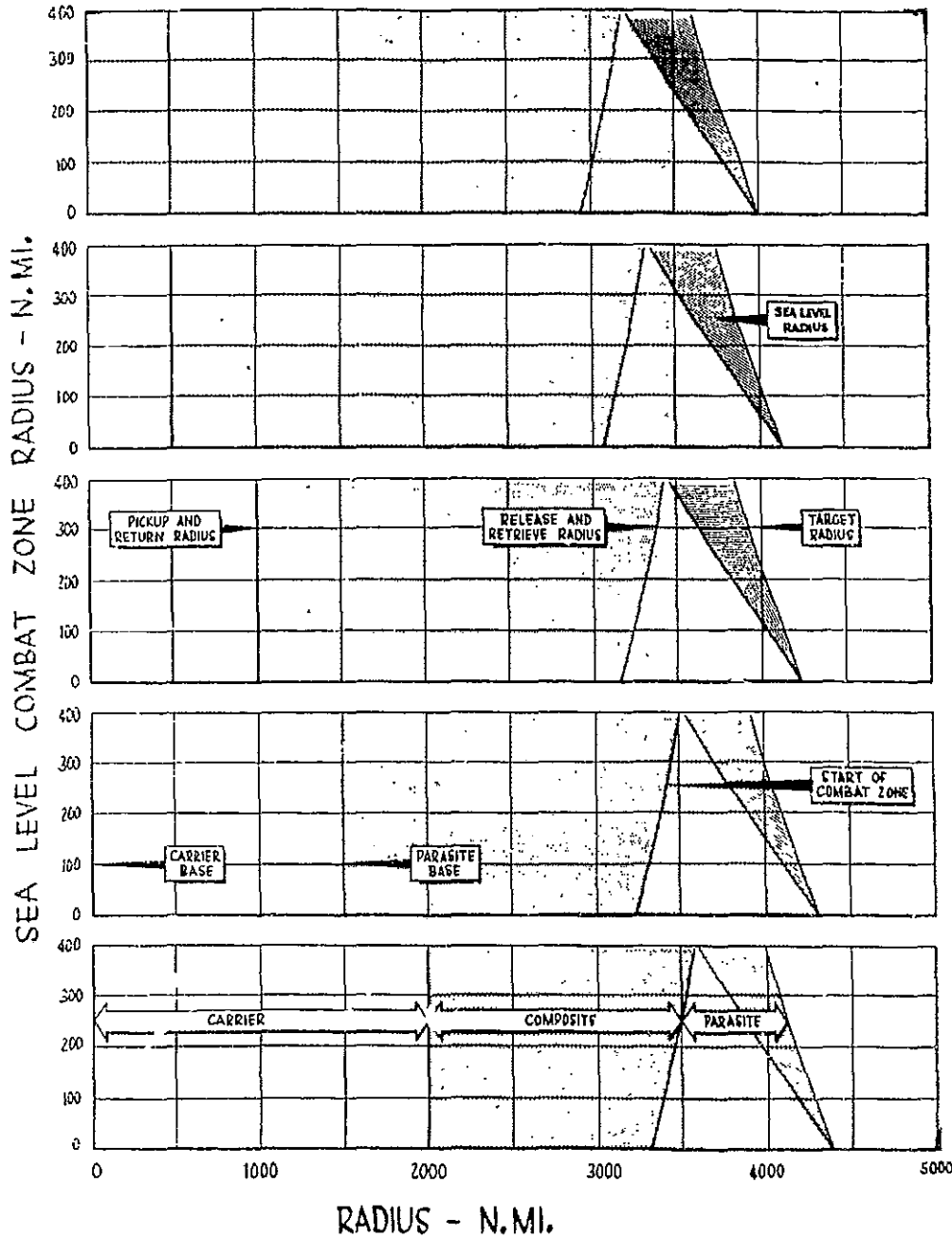
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# B-36 PARASITE SYSTEM RANGE CAPABILITIES

## BOMBING RADIUS MISSION

B-36J-CF (STRIPPED) CARRIER - 410,000 LB. GR. WT.  
 RF-84F (HEAVY) PARASITE - 3575 LB. BOMB LOAD

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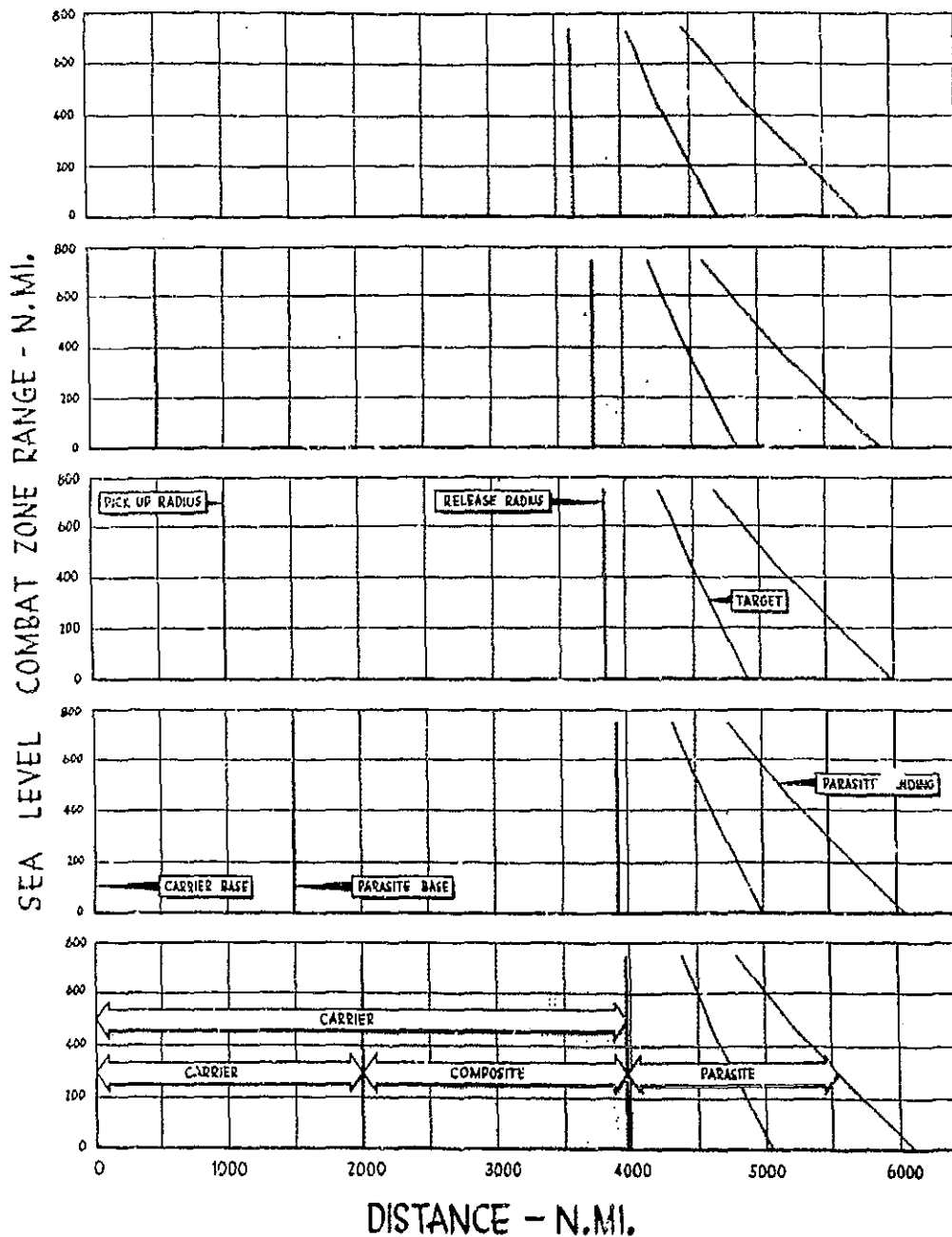


# B-36 PARASITE SYSTEM RANGE CAPABILITIES

RECONNAISSANCE POST-STRIKE BASE MISSION

B-36-J-CF (STRIPPED) CARRIER - 410,000 LB. GR. WT.

RF-84F (HEAVY PARASITE)



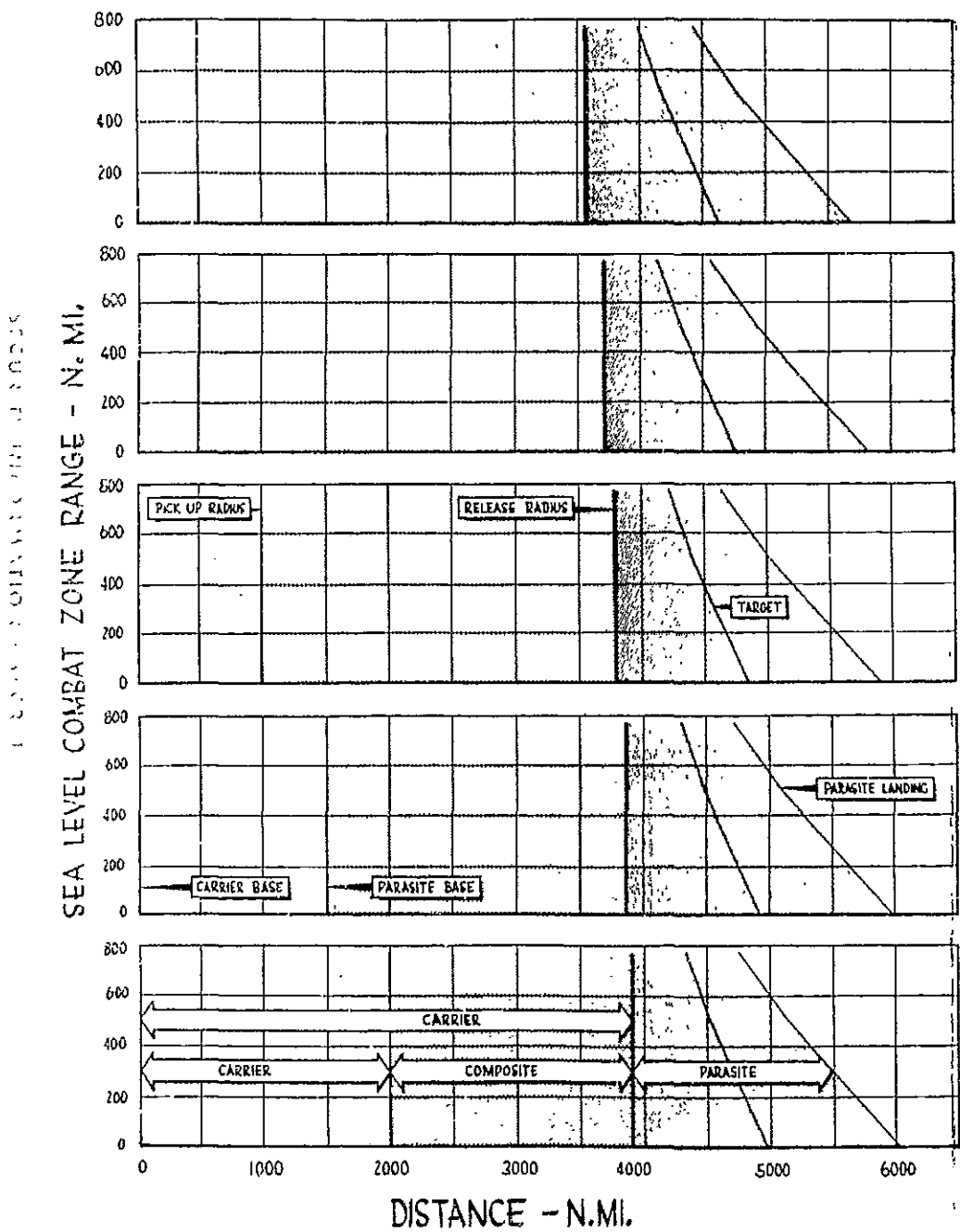
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# B-36 PARASITE SYSTEM RANGE CAPABILITIES

## BOMBING POST-STRIKE BASE MISSION

B-36 J-CF (STRIPPED) CARRIER - 410,000 LB GR. WT.

RF-84F (HEAVY PARASITE) - 3575 LB BOMB LOAD

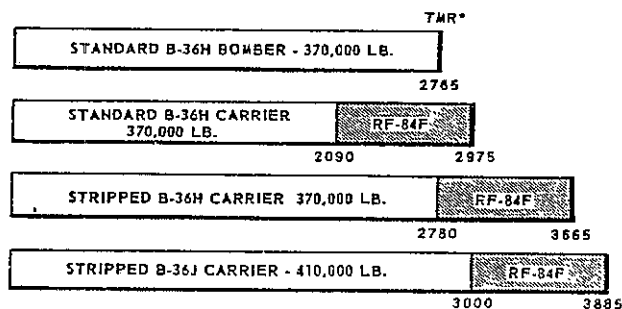


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## EFFECT OF VARIOUS B-36 CARRIERS

The performance shown on the previous pages utilized a stripped B-36J airplane as the carrier. In order to understand why this was selected and to give a comparison of the range capabilities of the parasite system and of the B-36, the following chart is presented.



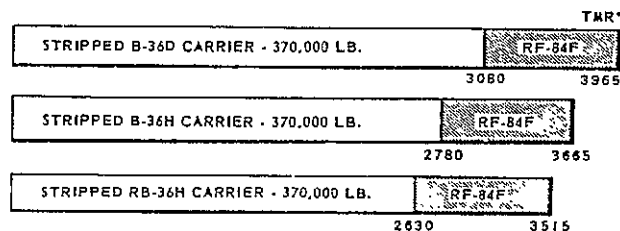
The first airplane shown is the standard B-36H bomber (370,000 pounds take-off gross weight) with a 10,000 pound bomb load flying a basic mission with 1000 n.mi. at 40,000 feet. Immediately below it can be seen the same airplane with the FICON provisions installed and the RF-84F carrying a 3500 pound bomb with 200 n.mi. flown at sea level. Since the Parasite carrying B-36 has less altitude operation, the radius is actually increased by 210 nautical miles. Reference to the previous maps shows that on almost all missions the B-36 carrier does not enter the early warning radar net and thus is not being disclosed to enemy

\*(Parasite range includes a 200 n.mi. combat zone at sea level)

action. Consequently, it is logical to strip the B-36 of equipment which would be necessary only when going into the defended target area. The last step shown represents the B-36J carrier which has increased fuel capacity to gross 410,000 pounds. This version gives greater range than the H model, and is the carrier shown in the previous performance.

Other B-36 models may be used as carriers, and the following chart illustrates the comparative range capabilities of these.

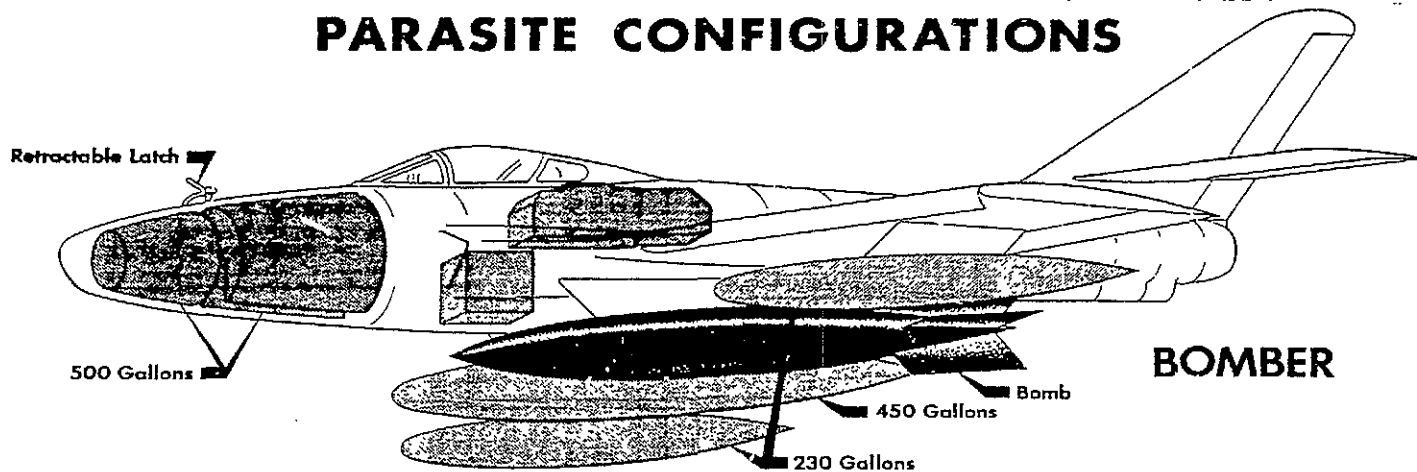
The earlier, B-36D, model affords the greatest range because of its lower basic weight and lower specific fuel consumption. It is also seen that the reconnaissance carrier affords approximately 150 n. mi. less range than the bomber version.



Carrier stripping (15,619 lbs.) includes deletion of all defensive armament (8680 lbs.) except the tail turret, self sealing fuel pads (2521 lbs.) plus miscellaneous equipment and furnishings (4418 lbs.) not required for carrier operation.

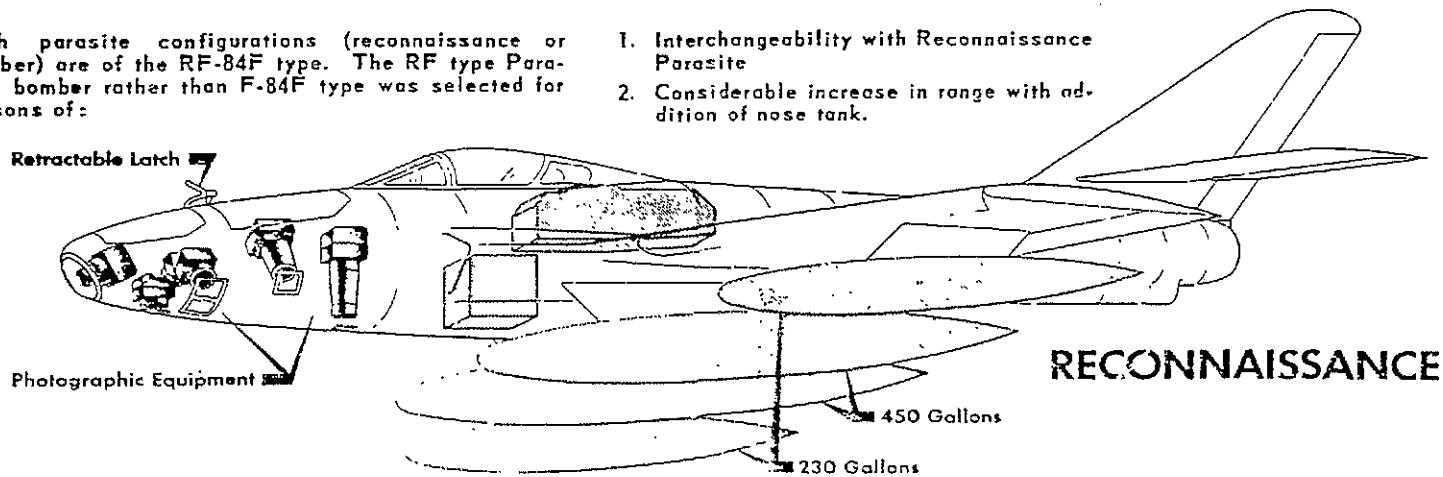
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## PARASITE CONFIGURATIONS



Both parasite configurations (reconnaissance or bomber) are of the RF-84F type. The RF type Parasite bomber rather than F-84F type was selected for reasons of:

1. Interchangeability with Reconnaissance Parasite
2. Considerable increase in range with addition of nose tank.



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# BASIC EQUIPMENT

## COMMUNICATIONS

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	ARC-34 COMMAND TRANSCEIVER	ARC-34 is adequate	Development in communications equipment is not warranted for this application. However, if better equipment is developed it would of course be used.
CARRIER	ARC-34 COMMAND TRANSCEIVER	ARC-34 is adequate	

## NAVIGATION

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	<p>GPI-A1 GROUND POSITION INDICATOR. A very reliable, light weight (50 lb) system with an accuracy of 5% of distance traveled.</p> <p>J-2 GYRO-SLAVED COMPASS. Compatible with GPI-A1.</p>	<p>APA-103 This is essentially the same as GPI-A1 but includes an automatic course computer.</p> <p>APN-82 This is APN-81 Doppler "Front End" plus GPI-A1 computer. Adds approx. 500 lbs. weight. Accuracy estimated at 3% of dist. traveled. Weight &amp; space penalty is severe for the Parasite.</p> <p>J-2 COMPASS - It would be desirable to use a more accurate heading reference in order to take advantage of APN-81 accuracy. Could use N-1 Directional Compass, but would further increase weight and space required.</p>	<p>Most important equipment problem is the development of a fighter navigation system with good accuracy and a size and weight compatible with fighter aircraft. Three projects should be carefully reviewed: G.E.'s Doppler Fighter Nav. System, and MIT's and NAA's Inertial Fighter Nav. Systems. GE's Doppler System may not have sufficient accuracy for this application, whereas, a production model of a light weight inertial system may not be realized in the immediate future. The ability to effect a production version of a fighter navigation system must be a prime consideration of a particular system. Pre-launch set-up of an inertial system should receive study. Consideration should be given to advanced carrier navigation systems including stellar-inertial.</p>
CARRIER	K-SYSTEM NAVIGATION with APS 23 for fix-taking	K-SYSTEM with AINS-23 (Parasite launch and rendezvous based on a preselected radar check point near launch)	

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# FOR PARASITE SYSTEM

## IDENTIFICATION (IFF)

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	APX-6 AIR-TO-GROUND TRANSPONDER  No Air-to-Air available	APX-6 IFF/SIF Air-to-Ground plus additional coding  APX-27 AIR-TO-AIR TRANSPONDER	For the Parasite System there is a need for integration of equipment for IFF, homing or rendezvous, all of which are alike in principle. Some progress along this line is being made in the dual use of APX-6 with APX-28 or 29 for both IFF and Homing. More could be done. See below.
CARRIER	APX-6 AIR-TO-GROUND TRANSPONDER No Air-to-Air available	APX-26 AIR-TO-AIR INTERROGATOR	

## RENDEZVOUS OR HOMING

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	APN-76 TRANSPONDER OR ARA-25 HOMING	APW-16 TRANSPONDER - INTERROGATOR OR APX-6 TRANSPONDER FOR HOMING OR ARA-22 HOMING	The use of ARN-21 VOR-DME with an Airborne Omi Station would provide near optimum rendezvous capabilities and at the same time serve for post strike base homing. This type of system is certainly feasible and should be studied in detail. With the APX-6 used for Air-to-Air IFF, by providing suitable equipment in the carrier, the APX-29(9#) could be used for back-up and the functions of rendezvous and IFF accomplished with a minimum of fighter equipment.
CARRIER	APN 12 INTERROGATOR FOR APN 76 ARC-34 FOR ARA-25 HOMING	APA-87 INTERROGATOR - RESPONDER for APW-16 APX-28 OR 29 for use with APX-6 Homing ARC-33 for use with ARA 22 Homing	

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# SPECIAL EQUIPMENT

## PHOTO RECONNAISSANCE

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	<p>High &amp; Low Altitude Daylight Cameras:                      1 ea. K-22A 6"-12" Forward Oblique                      2 ea. K-38-24"-36" Split Vertical                      3 ea. K-17C-6" Tri-met</p> <p>Low Altitude Night Camera                      1 ea. K-37-12" Vertical</p>	<p>High &amp; Low Altitude Daylight Cameras:                      1 ea. K-22A 6"-12" Forward Oblique                      2 ea. K-48 or CA-16-1 Split Vertical                      3 ea. CA-16-6" Tri-met</p> <p>Low Altitude Night Camera                      1 ea. K-43 or K47 Vertical</p>	<p>None of the cameras listed at the left is stabilized. Though those listed in the second column offer substantial improvement over those of the first column, the amount of camera control is limited. The feasibility of stabilizing at least the vertical cameras, and for providing an automatic Universal Camera Control System (UCCA) should be studied. Both problems are affected by the type of primary navigation system prescribed and should be studied in this light.</p>

## FERRET RECONNAISSANCE

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	<p>None available in the microwave band</p>	<p>APD-4 in three parts:                      1. 1.0 - 2.6 Kilomegacycles - 239 lbs. less mounting                      2. 2.3 - 7.5 Kilomegacycles - 194 lbs. less mounting                      3. 7.05 - 33.0 Kilomegacycles - 179 lbs. less mounting</p>	<p>The Ferret equipment listed at the left could be had in two or three years if ordered now. Parasite system would provide a near optimum vehicle for this equipment. If display is made visible to pilot he can:                      1) Avoid enemy gun-laying radar                      2) Avoid unnecessarily long exposure to enemy defenses.</p>

## RADAR RECONNAISSANCE

	CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
PARASITE	<p>None available</p>	<p>APS-60 with a weight of 250 lbs. less cables, this Ku-band radar can provide basis for radar reconnaissance and bombing.</p>	

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## FOR PARASITE SYSTEM

### BOMBING

PARASITE

CURRENTLY AVAILABLE	UNDER DEVELOPMENT	RECOMMENDATIONS & COMMENTS
<p>MA-1 LABS. COMPUTER (Low Level Toss Bombing) g-meter (Mil-A-5385) BT-9 or Equivalent Dive Bombing Computer for high altitude bombing (20,000 feet Max.)</p>	<p>MA-4 FCS Sperry Fire Control System using APG-31. MA-6 FCS G.E. Fire Control System using BT-9 principle and APS-42. Consideration should be given to the use of these systems although neither may offer a substantial improvement over the MA-1, BT-9 combination. Radar for range only does not appear to be justified.</p>	<p>The equipment listed in the column at the far left offers a good "cheap and dirty" solution to the bombing problem under visual sighting conditions. The equipment in the second column is more complex and perhaps more accurate, but still requires visual sighting and may not be justified. The big improvement for bombing would be in providing an all-weather capability. This appears feasible with the APS-60 Search Radar. The details of such a system for fighter aircraft should be studied.</p>

### CONCLUSIONS

Both basic and special equipment that would permit satisfactory operation for photo reconnaissance and visual bombing are available for installation. This equipment has the advantage of being relatively simple and reliable, but a major deficiency is the inaccuracy in navigation of the proposed GPI-A1.

Equipment now being developed for other purposes, which will be available in the next two or three years does not, in general suit the requirements of a parasite

system. Ferret and radar reconnaissance equipment are well developed and will be available in this time period provided an immediate production program is initiated.

Production of the first articles should be paralleled by a realistic equipment and systems study which would have as its objective the production of an advanced system tailored to the specific needs of a parasite system.

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# FUTURE PARASITES

**F4D**

TARGET SPEED 607 KNOTS AT S.L.  
POSSIBLE IMPROVEMENT IN RADIUS

**F-102**

TARGET SPEED 756 KNOTS AT S.L.

**F-105**

HIGH TARGET SPEED  
POSSIBLE IMPROVEMENT IN RADIUS

**ULTIMATE**

TARGET SPEED  $M = 2.0$   
RADIUS 1000 N.MI.

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## COMBINED SYSTEMS

An alternate type of parasite system which may be considered is the Wing Tip Tow type wherein two parasite aircraft are attached to the wing tips of the carrier aircraft. It is possible for a system of this type to put two parasites over the target at approximately the same total mission radius as a single bomb bay type; however, pilot fatigue becomes excessive from the some 15 hours prior to launch. This may be overcome by combining the wing tip tow with the bomb bay type and alternating for relief. A total mission radius of 3972 nautical miles may be realized with two parasites and 3120 nautical miles with three in this combination.

A more attractive version of the combined system is probably that of towing two drone aircraft at the carrier's wing tip to be controlled after launch by a parasite aircraft which has been carried in the bomb bay.

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## B-36 PARASITE SYSTEM PROGRAM AND SCHEDULE

<i>PROGRAM SO AHEAD!</i>		1953					1954					1955					1956															
		A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O
ENGINEERING	RB-36 CARRIER	█		█																												
	B-36 CARRIER	█		█																												
	RF-84F PARASITE RECON.	█		█																												
	RF-84F PARASITE BOMBER	█		█																												
FLIGHT TEST RB-36F/YF-84F	█																															
APG EVALUATION	█																															
PRODUCTION PROTOTYPE MODIFICATION	RB-36 CARRIER	█																														
	RF-84F PARASITE RECON.	█																														
FLIGHT TEST PROD. PROTOTYPE AIRCRAFT	RB-36 CARRIER (DOORS)	█																														
	RF-84F PARASITE-RECON. COMPOSITE	█																														
U.S.A.F. OPERATIONAL SUITABILITY TESTS																																
MODIFICATION	RB-36 CARRIER	█																														
	B-36 CARRIER	█																														
	RF-84F PARASITE RECON.	█																														
	RF-84F PARASITE BOMBER	█																														
PARASITE SYSTEM STUDY	IMPROVED EQUIPMENT	█																														
	FUTURE PARASITES	█																														
INSTALLATION & FLIGHT EVALUATION OF IMPROVED EQUIPMENT																																
MODIFICATION FOR FUTURE PARASITE PROTOTYPE																																

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## KEY DECISIONS

- 1 SYSTEM MANAGERSHIP?
- 2 ENGINEERING RESPONSIBILITY FOR PARASITE?
  - a. RF-84F PARASITE PROVISIONS
  - b. RF-84F BOMBER CONVERSION PLUS PARASITE PROVISIONS
- 3 MODIFICATION RESPONSIBILITY OF PARASITE AIRCRAFT AND NUMBER OF EACH TYPE?
- 4 TYPE AND MODEL OF B-36 CARRIER?
  - a. BOMBER OR RECONNAISSANCE
  - b. D,F,H, OR J MODEL
- 5 AUTHORIZATION OF PARASITE SYSTEMS STUDY & DEVELOPMENT PROGRAM.

# RULES & ALLOWANCES

## B-36 CARRIER

1. Warm-up and take-off allowance is 10 minutes of reciprocating engine normal power fuel consumption plus 5 minutes of jet engine normal power fuel consumption.
2. Composite take-off is with the parasite in stowed position.
3. Allow 15 minutes cruise with no range gain at 5000 feet altitude for separate take-off and advance base pick-up.
4. Refuel parasite to capacity for separate take-off and advance based pick-up missions.
5. Allowance is made for all climbs (NRP). No range gain or fuel consumed in descent is considered.
6. All outbound cruise at 5000 feet, then climb on course to reach 25,000 feet at the release point.
7. For radius missions, loiter at 25,000 feet using long range cruise power for fighter mission time plus 15 minutes. For post-strike base missions, start inbound cruise immediately after release of parasite.
8. Inbound, cruise at 20,000 feet with parasite attached or at 25,000 feet without parasite.
9. Fuel reserve is 5% of initial fuel plus fuel for 10 minutes cruise at sea level over base.
10. All fuel...

## RF-84F PARASITE

1. Warm-up allowance is 1 minute's fuel consumption at normal sea level static power. Where necessary, take-off allowance is an additional 4 minutes of normal power fuel consumption.
2. Fighter fuel allowance for separate take-off and climb to 5000 feet is replenished by the carrier.
3. Allowance is made for all climbs (NRP). No range gain in descent is considered.
4. Cruise portion of the mission is flown at optimum altitude (cruise ceiling).
5. All zone action conducted at normal rated power.
6. Combat zone altitude is sea level (except for zero zone at high altitude).
7. Two minutes NRP evasive action at target (No range gain).
8. Fighter time is not increased for rendezvous.
9. External tanks are dropped in pairs. On bombing missions, one empty tank is dropped with the bomb.
10. Fuel reserve is 5% of initial fuel plus 10 minutes at maximum endurance at sea level to cover tactical maneuvering.

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