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Japanese

A I R C R A F T

AIR INTELLIGENCE GROUP, DIVISION OF NAVAL INTELLIGENCE
OFFICE OF THE CHIEF OF NAVAL OPERATIONS, NAVY DEPARTMENT

OPNAV - 16 - VP 105
M A R C H 1945

P H O T O G R A P H I C I N T E L L I G E N C E R E P O R T

JAPANESE AIRCRAFT

**UNITED STATES NAVAL PHOTOGRAPHIC INTELLIGENCE CENTER
NAVY YARD, WASHINGTON 25, D. C.**

RESTRICTED

F O R E W O R D

This study is designed to aid accurate identification of Japanese aircraft from aerial photographs. It is intended as a training manual for Photographic Interpreters and as a standard reference.

Each aircraft type has been presented as the Photographic Interpreter will see it. Three-dimensional stereograms as well as oblique and gun camera photographs are shown at different scales and under various conditions. Silhouettes and identification data are provided for all aircraft and, in cases of similar planes, distinguishing features are pointed out.

Supplementary pages will be issued from time to time as new aircraft types are recognized or as better photography becomes available on existing types.



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PHOTOGRAPHIC INTELLIGENCE CENTER

R E S T R I C T E D

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TABLE OF CONTENTS

INTRODUCTION

SECTION 1 FOUR-ENGINE LANDPLANES

1. LIZ	1.01
2. RITA	1.02

SECTION 2 TWIN-ENGINE LANDPLANES

SILHOUETTE PAGE	2.01
1. TABBY	2.02
2. BETTY	2.04
3. NELL	2.07
4. SALLY	2.10
5. TOPSY	2.13
6. PEGGY	2.15
7. HELEN	2.16
8. FRANCES	2.18
9. LILY	2.20
10. IRVING	2.23
11. NICK	2.25
12. DINAH	2.27

SECTION 3 SINGLE-ENGINE LANDPLANES

SILHOUETTE PAGE	3.01
1. KATE	3.02
2. JILL	3.04
3. VAL	3.06
4. MYRT	3.08
5. SONIA	3.09
6. ZEKE	3.11
7. TONY	3.16
8. JUDY	3.18
9. OSCAR	3.20
10. FRANK	3.22
11. JACK	3.23
12. TOJO	3.25

SECTION 4 SEAPLANES

SILHOUETTE PAGE	4.01
1. MAVIS	4.02
2. EMILY	4.04
3. JAKE	4.06
4. PAUL	4.08
5. RUFÉ	4.09
6. PETE	4.11
7. DAVE	4.13
8. GLEN	4.15

SECTION 5 OBSOLETE AIRCRAFT

1. CHERRY	5.01
2. TESS	5.01
3. THELMA	5.02
4. THORA	5.02
5. THERESA	5.03
6. THALIA	5.03
7. MARY	5.04
8. ALF	5.04
9. CLAUDE	5.05
10. NATE	5.05
11. IDA	5.06
12. BABS	5.06

SECTION 6 NEW AIRCRAFT

1. GRACE	6.01
2. GEORGE	6.01
3. NORM	6.02
4. REX	6.02
5. MISCELLANEOUS	6.03

ALPHABETICAL INDEX OF AIRCRAFT

ALF	5.04	NATE	5.05
BABS	5.06	NELL	2.07
BETTY	2.04	NICK	2.25
CHERRY	5.01	NORM	6.02
CLARA	6.03	OSCAR	3.20
CLAUDE	5.05	PATSY	6.03
DAVE	4.13	PAUL	4.08
DINAH	2.27	PEGGY	2.15
EDNA	6.03	PETE	4.11
EMILY	4.04	REX	6.02
FRANCES	2.18	RITA	1.02
FRANK	3.22	ROB	6.03
GEORGE	6.01	RUFÉ	4.09
GLEN	4.15	SALLY	2.10
GRACE	6.01	SAM	6.03
HELEN	2.16	SONIA	3.09
IDA	5.06	STEVE	6.03
IRVING	2.23	TABBY	2.02
JACK	3.23	TESS	5.01
JAKE	4.06	THALIA	5.03
JILL	3.04	THELMA	5.02
JUDY	3.18	THERESA	5.03
KATE	3.02	THORA	5.02
LILY	2.20	TOJO	3.25
LIZ	1.01	TONY	3.16
LUKE	6.03	TOPSY	2.13
MARY	5.04	VAL	3.06
MAVIS	4.02	ZEKE	3.11
MYRT	3.08		

INTRODUCTION

Operational Japanese Aircraft have been given short Allied Code Names for purposes of simplicity in reporting. These code names take the form of male and female names, such as "TONY" and "SALLY". Male designations are given to Army and Navy fighter planes and to Navy reconnaissance float planes. All other planes receive female designations. At the present time the sole authority for the issuance of future code names is vested in the Technical Air Intelligence Center, NAS, Anacostia, D.C. Photographs and pertinent data on suspected new aircraft types should be forwarded immediately to the above activity. Tentative code names should not be assigned in the field or by other agencies.

In addition to a code name each aircraft has a model designation. Formerly, arbitrarily chosen "Mark Numbers" were used to indicate the various modifications of an aircraft type. These proved confusing, however, and inadequate to handle the numerous modifications being encountered. As a result the Mark System has been abandoned and, instead, the nomenclature applied to the planes by the Japanese themselves has been adopted. This consists of a system of separate Navy and Army model numbers.

Japanese Navy model numbers are composed of two digits and the first version of a Navy plane is always known as Model 11. As modifications are made to this original version the first digit of the model number is increased if the change is structural and the second digit is increased if the engine is changed. Thus, a ZEKE 11 becomes a ZEKE 21 if the wing shape is altered, a ZEKE 12 if only the engine is changed and a ZEKE 22 if both changes are made. With further changes the digits increase in progression.

Japanese Army model numbers are composed of only one digit and the first version of an Army plane is always known as Model 1. This model number may be increased if either an engine or a structural change is made in the original version.

Training aircraft are now being assigned Allied Code Names as well. These designations will be in the form of tree names, such as "CEDAR" and "OAK", in order to avoid confusion with code names of combat aircraft.

Photo Interpretation reports should list the aircraft by code names and by model numbers whenever possible. Older forms of nomenclature listing the aircraft by manufacturer, year of adoption and purpose, such as "Kawanishi 97 Flying Boat", are awkward as well as unnecessary.

The identification of aircraft from aerial photographs is largely a matter of practice and patience, provided adequate intelligence data is available as to the types, appearances and sizes of aircraft likely to be encountered. Early in the war intelligence data on Japanese aircraft was very sketchy and Interpretation Reports were limited to distinguishing between single-engine fighters, twin-engine bombers and seaplanes of several size groupings. With the advent of more complete intelligence material, however, and with widespread photo coverage of good quality available, exact identification is now possible.

Accurate aircraft identification can be used to determine the following:

1. Whether base under surveillance is Army or Navy.
2. Type and strength of activity carried on at base.
3. Type of attack to be expected from base.
4. Advance information as to types and numbers of aircraft Allied pilots are likely to meet from base.
5. Amount and importance of damage inflicted to grounded aircraft by Allied attacks.
6. Types and locations of aircraft to be secured by Crash Intelligence crews.
7. Total air strength and relative importance of each aircraft type as indicated by overall distribution.
8. New aircraft types.

The normal procedure in identifying aircraft present on an airfield is first to establish an accurate photograph scale. To do this, a large and well-defined aircraft whose identity is certain must be found and measured. As a safety factor, the photograph scale determined from the altitude and camera focal length may be used to check the identity of the plane. A corrected photograph scale can then be calculated by using the known dimensions of the airplane and its dimensions as measured on the photograph. With this corrected scale the remaining aircraft can be accurately measured and identified. It should be remembered, however, that this scale will vary from photograph to photograph of the same sortie and that the scale may not be constant on all parts of the same print. This is especially true if the photograph is taken at any angle from the true vertical.

Accuracy of identification is often dependent upon accuracy of measurement. Thus it is always important to distinguish between the actual image of the plane, its shadow, and similarly colored ground markings. Glass portions, such as the fuselage nose of bombers, frequently will not show up and the measurements will prove misleading.

R E S T R I C T E D

INTRODUCTION

Use as small a unit of measurement as possible, one-tenth of a millimeter if available, under only moderate magnification. A high magnification will tend to introduce spherical aberration from the lens and consequent scale distortion.

In identifying aircraft in stereo it is important first to have a mental image of how each plane will look in three dimensions. For this purpose stereograms of the planes at varying scales are provided in the body of this publication. Also included are front, side and plan view silhouettes. The majority of these silhouettes have been prepared from master drawings furnished by the Technical Air Intelligence Center and are believed to be essentially accurate as to detail. Those silhouettes which may require alteration of detail upon additional information are marked "provisional". It should be kept in mind, however, that a silhouette is two-dimensional and necessarily must differ from a three-dimensional plane which has curved surfaces and is parked at an angle to the ground. For example, all slight tapers, as on the wing of a plane, will tend to be minimized in stereo and will appear as straight lines. Features which may appear important on a silhouette actually may prove insignificant as far as identification in stereo is concerned.

Upon measurement of wing spans it is relatively easy to assign aircraft to size groupings. Then it becomes necessary to track down each plane and to distinguish it from similar planes of the group on the basis of plane detail. Details which should be checked to track down a plane are too numerous to list at length. They include such items as wing taper and plan shape, wing construction, span-length ratio, projection of the fuselage nose relative to the engine nacelles, size and position of the greenhouse, shape and span of the tailplane, distance between wing and tailplane, projection of the rudder aft of the tailplane, etc. Recognition of the relative importance of these details is largely a matter of study and practice. Eventually recognition becomes largely automatic with an overall impression of each plane implanted in the mind. It is still wise, however, always to check one's judgement by measuring the wing span and going over the details of each plane identified.

In identification it should be noted that Army air bases will normally be occupied by Army planes only and Navy air bases by Navy planes only. Exceptions to this rule are infrequent but may occur more often as the Japanese forces are pressed closer together. A few planes are used by both branches of the service. These include BABS, DINAH, TABBY and a few trainers.

Above all, an identification should not be reported as positive if any doubt exists as to the exact identity of a plane. Instead, one of the qualifying terms "possible" or "probable" should be used or the plane assigned to a size grouping only. Small scale photos, photo distortion, halation, camouflage, shadows--any one of these conditions can alter or obscure a plane's outline sufficiently to render it unidentifiable. But practice and close observation can keep these cases down to a minimum.

R E S T R I C T E D

*For technical and performance data this manual should be used in conjunction with TAIC Manual No. 1, Japanese Aircraft, dated December 1944.

Listed below by service types are the Army and Navy planes most apt to be encountered in the near future. Obsolete or obsolescent planes are marked with asterisks. These planes are being used in combat and training capacities.

<u>NAVY</u>		<u>ARMY</u>	
FIGHTERS		FIGHTERS	
*CLAUDE	JACK	*NATE	FRANK
ZEKE	SAM	OSCAR	ROB
RUFE	GEORGE	TONY	STEVE
IRVING	REX	TOJO	PATSY
FRANCES	LUKE	NICK	
RECONNAISSANCE		RECONNAISSANCE	
*ALF	NORM	*MARY	CLARA
*DAVE	*BABS	*IDA	EDNA
JAKE	DINAH	SONIA	
PETE	JUDY	*BAES	
GLEN	IRVING	DINAH	
PAUL	MYRT		
HORIZONTAL BOMBERS		HORIZONTAL BOMBERS	
NELL	(Medium)	*MARY	(Light)
BETTY	"	LILY	"
FRANCES	"	SALLY	(Medium)
LIZ	(Heavy)	HELEN	"
RITA	"	PEGGY	"
DIVE BOMBERS		DIVE BOMBERS	
VAL		SONIA	
JUDY		LILY	
TORPEDO BOMBERS		TRANSPORTS	
KATE	FRANCES	*THALIA	
JILL	NELL	*THERESA	
GRACE	BETTY	*THORA	
TRANSPORTS		*THELMA	
*TESS	BETTY	TOPSY	
TABBY	MAVIS	TABBY	
LIZ	EMILY		
NELL			
FLYING BOATS			
*CHERRY			
MAVIS			
EMILY			

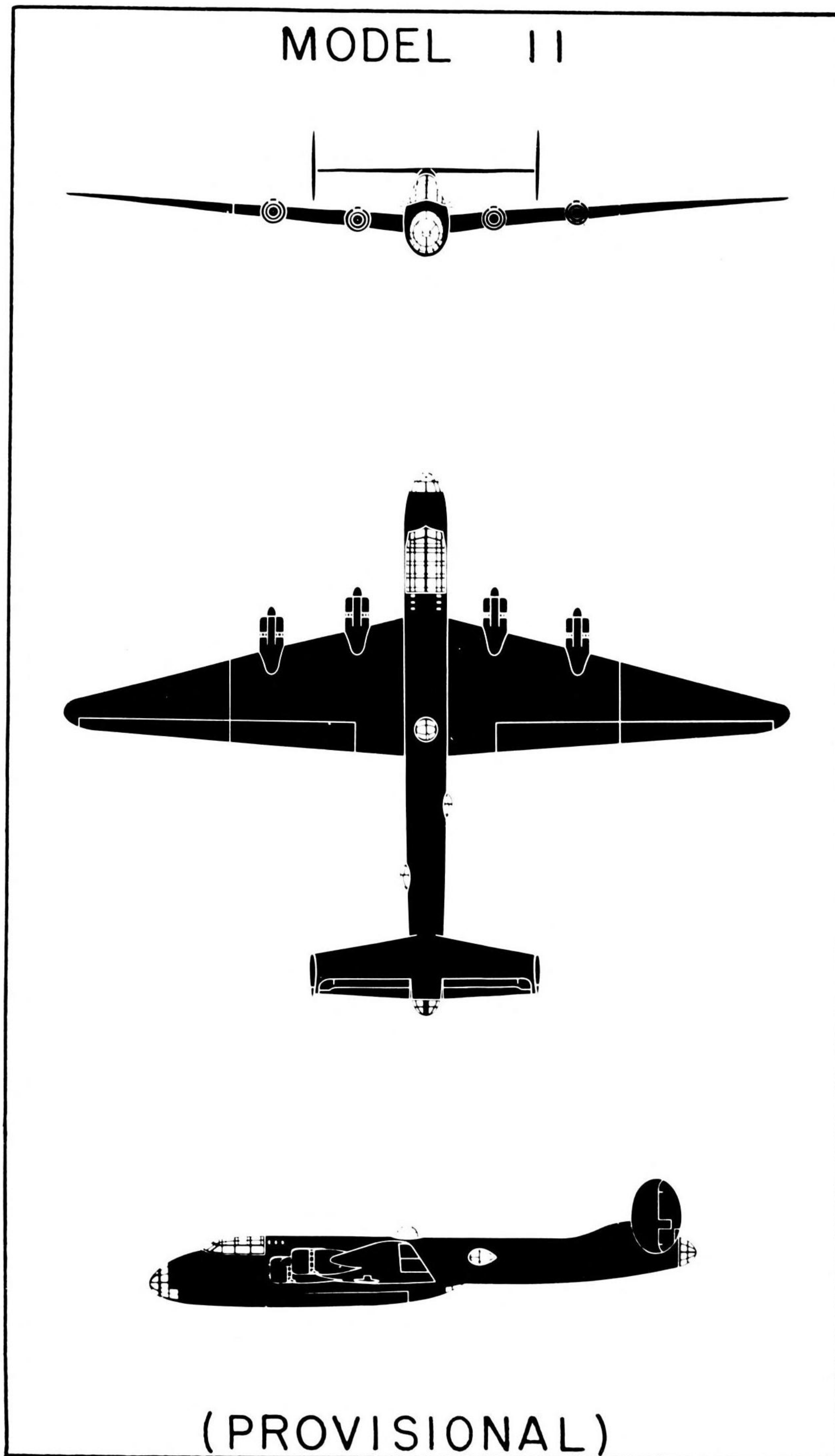
SECTION - I

1.01 1.99

FOUR - ENGINE LANDPLANES

RESTRICTED

- NAKAJIMA
- LAND ATTACK
- S-138' 3"
- L-101' 9"



R E S T R I C T E D

"LIZ"

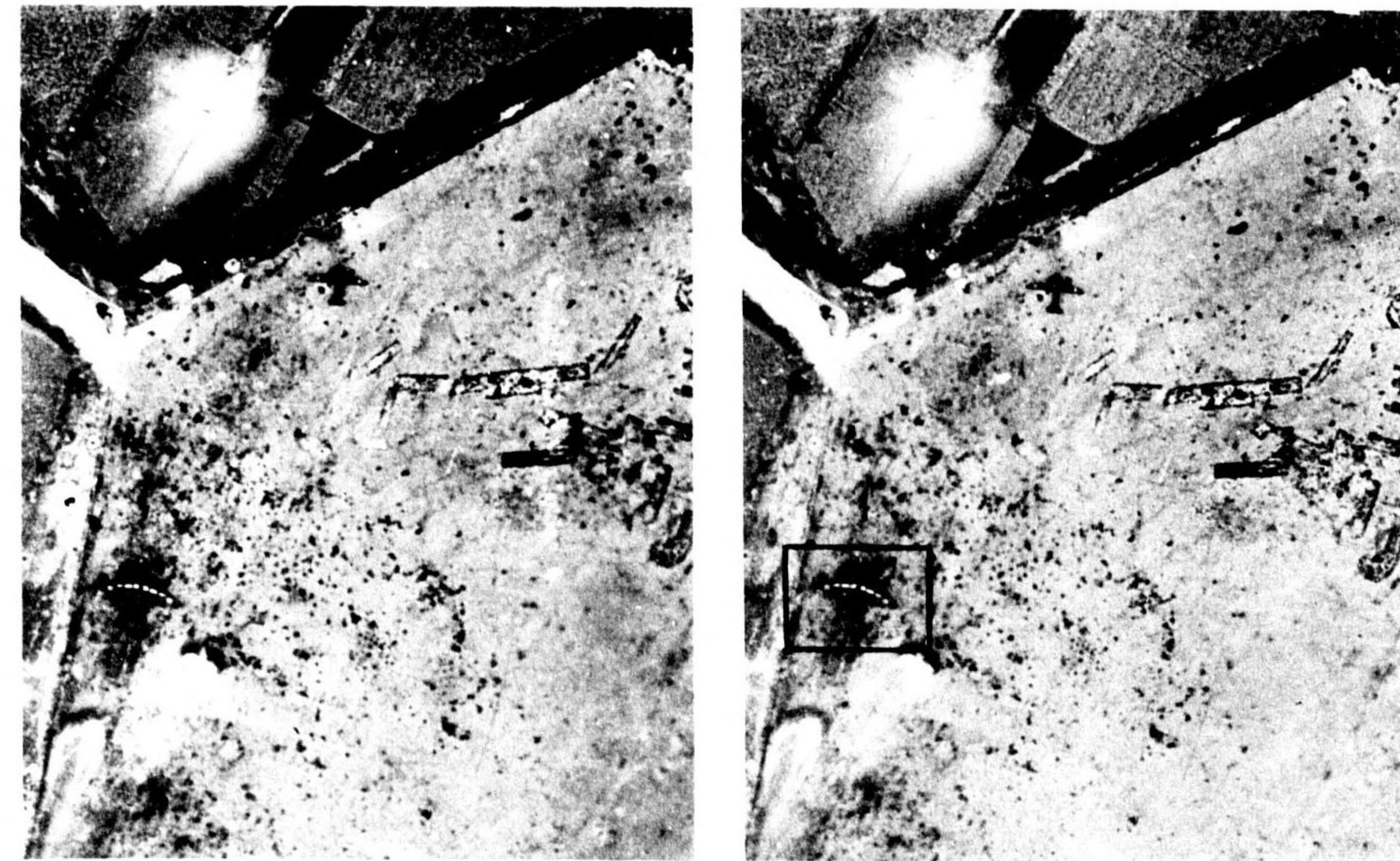


Photo Scale 1:5685

Identification Data

- Four-engine, mid-wing monoplane.
- Fat wing has extremely wide span.
- Leading edge of wing has sharp taper, trailing edge is straight.
- Wing is set well back on fuselage.
- Twin fins and rudders set outboard on tailplane.
- Dorsal ball turret near trailing edge of wing.
- Tail turret projects aft of tailplane.

LIZ II is the only operational four-engine landplane produced by the Japanese up to 1945. Although designed as a heavy bomber, it proved unsuccessful and was used only as a transport. There is a possibility that a Model 12 LIZ with improved engines may appear.

"RITA"

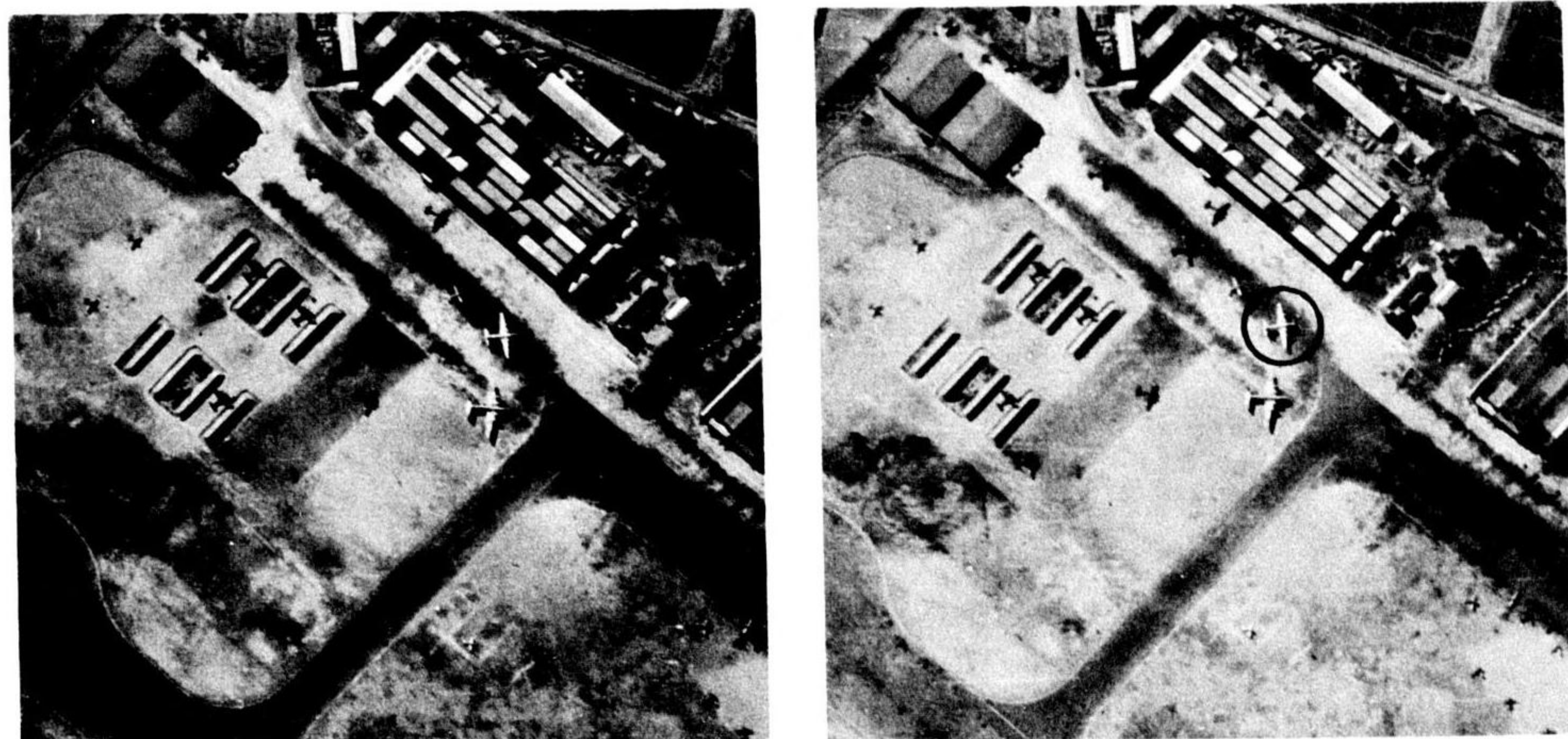


Photo Scale 1:9150

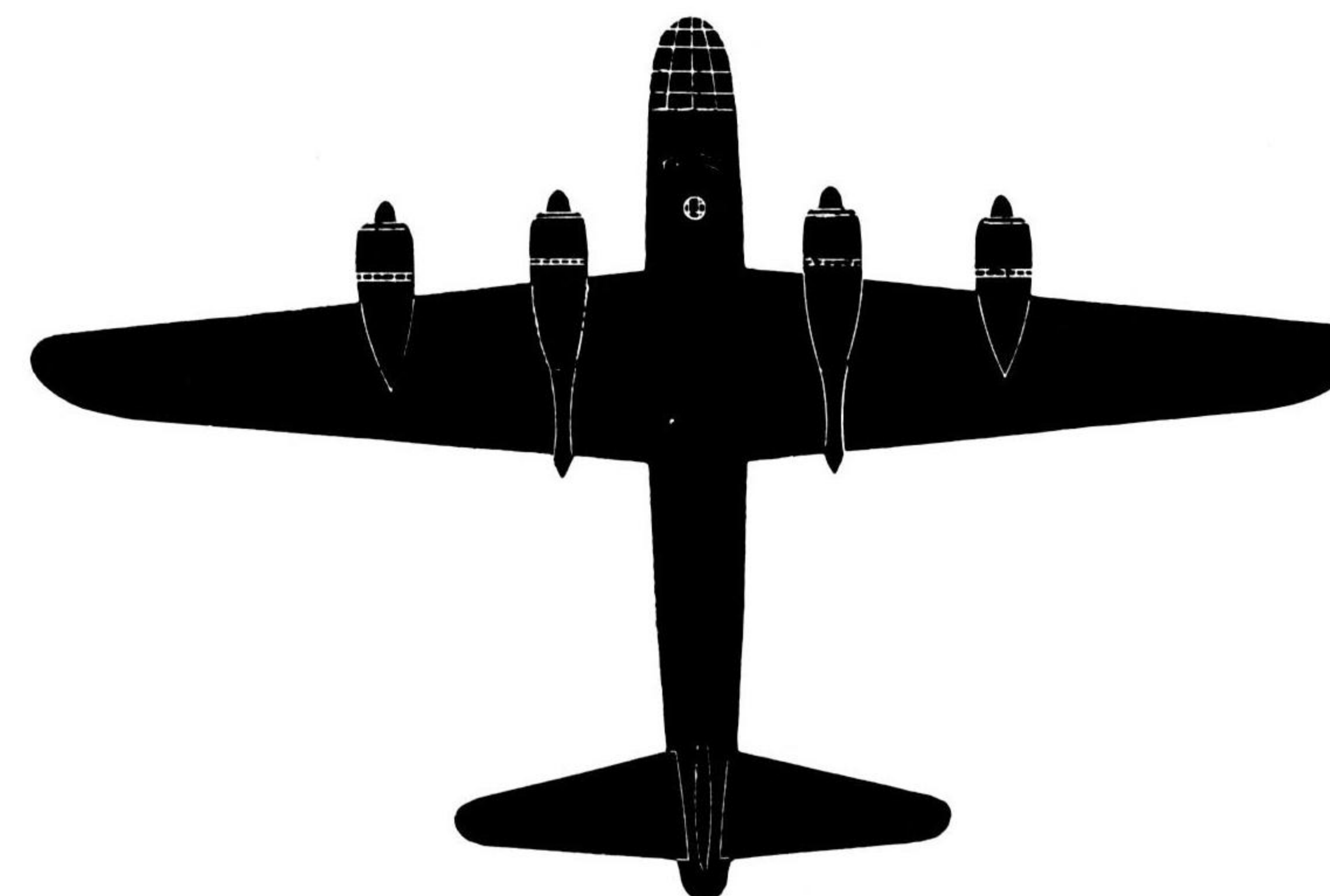
Identification Data

- Four-engine, mid-wing monoplane.
- Moderate taper to leading and trailing edges of wing.
- Inboard nacelles project beyond trailing edges of wing.
- Tail turret projects well aft of tailplane.
- Tailplane of wide span and narrow chord.

RITA is a new four-engine bomber about which very little is known. Scale from photographs gives a span of 107' and a length of 75' approximately. It is considered doubtful that RITA can be produced in sufficient quantity to become operational in the near future. Present production estimates give one RITA per month.

- NAKAJIMA ?
- LAND ATTACK
- S - (107')
- L - (75')

MODEL II



(PROVISIONAL)

RESTRICTED

SECTION-2

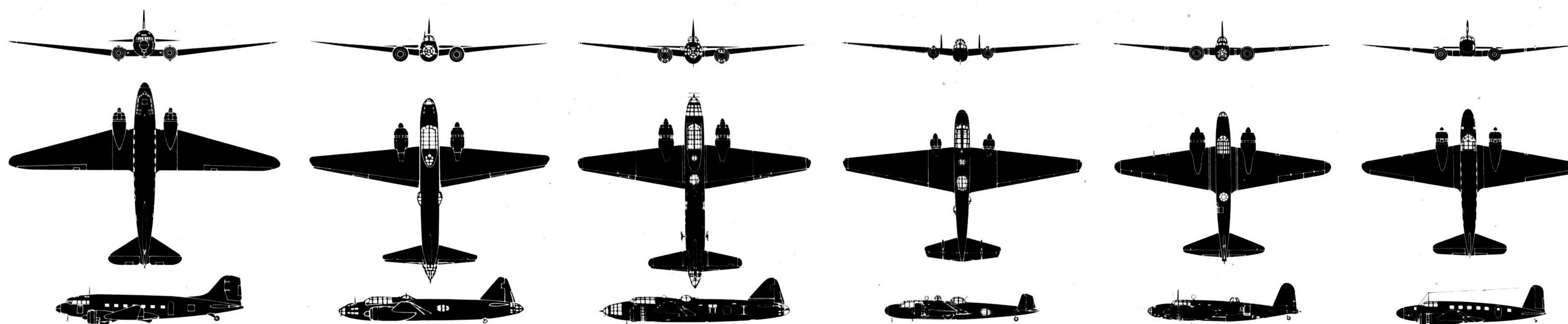
2.01 2.99

TWIN - ENGINE LANDPLANES

RESTRICTED

SILHOUETTES

TO SCALE 1" = 50'



TABBY 32
Navy Transport
S - 95'
L - 64' 8"

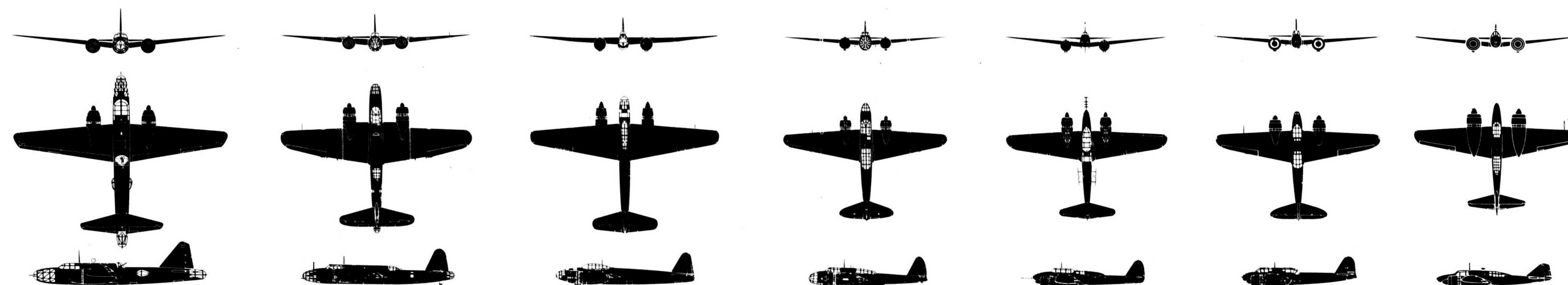
BETTY 11
Navy Land Attack
S - 82'
L - 65' 7"

BETTY 22
Navy Land Attack
S - 82'
L - 64' 6"

NELL 23
Navy Land Attack
S - 82'
L - 54'

SALLY 2
Army M. Bomber
S - 74' 8"
L - 52'

TOPSY 1
Army Transport
S - 74' 2"
L - 52' 10"



PEGGY 1
Army M. Bomber
S - 73' 10"
L - 61' 4"

HELEN 2
Army M. Bomber
S - 66' 7"
L - 53'

FRANCES 11
Navy T. B. - N. F.
S - 65' 7"
L - 49' 2"

LILY 2
Army L. Bomber
S - 57' 4"
L - 42' 1"

IRVING 11
Navy R. - N. F.
S - 55' 9"
L - 39' 11"

NICK 1
Army Fighter
S - 49' 6"
L - 34' 8"

DINAH 3
Army Recce.
S - 48' 4"
L - 36' 3"

RESTRICTED

"TABBY"

- NAKAJIMA OO
- TRANSPORT
- S - 95'
- L - 64' 8"



Photo Scale 1:5165

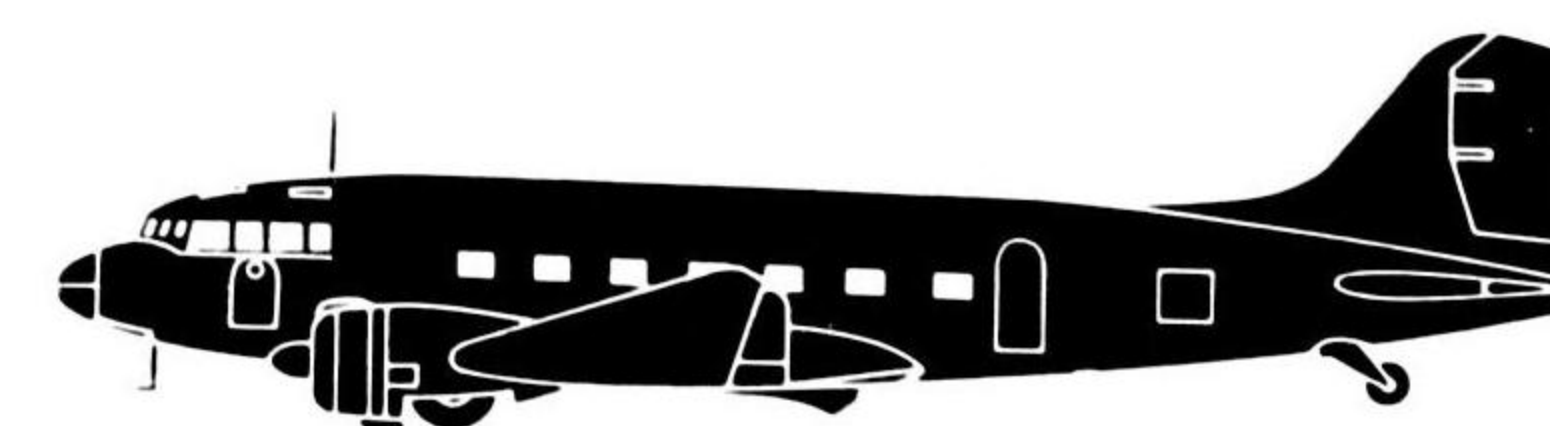
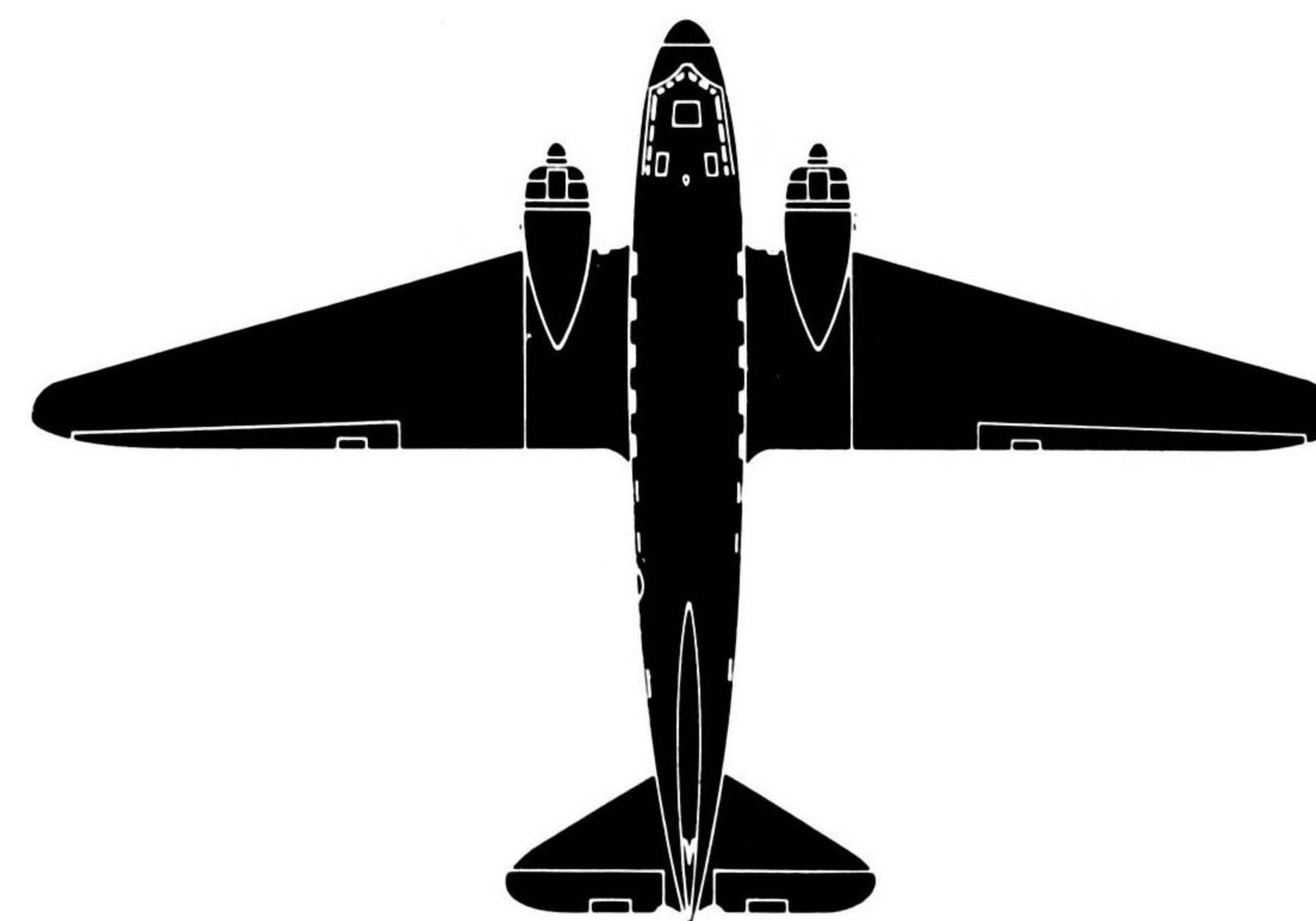
Identification Data

- Leading edge of wing has extreme sweepback outboard of engine nacelles and a straight center section; trailing edge is straight.
- Fat, transport fuselage.
- Fuselage nose and engine nacelles are set close together and extend well forward of wing.
- Large tailplane with sweptback leading edge and straight trailing edge.
- Small windows set in side of fuselage.

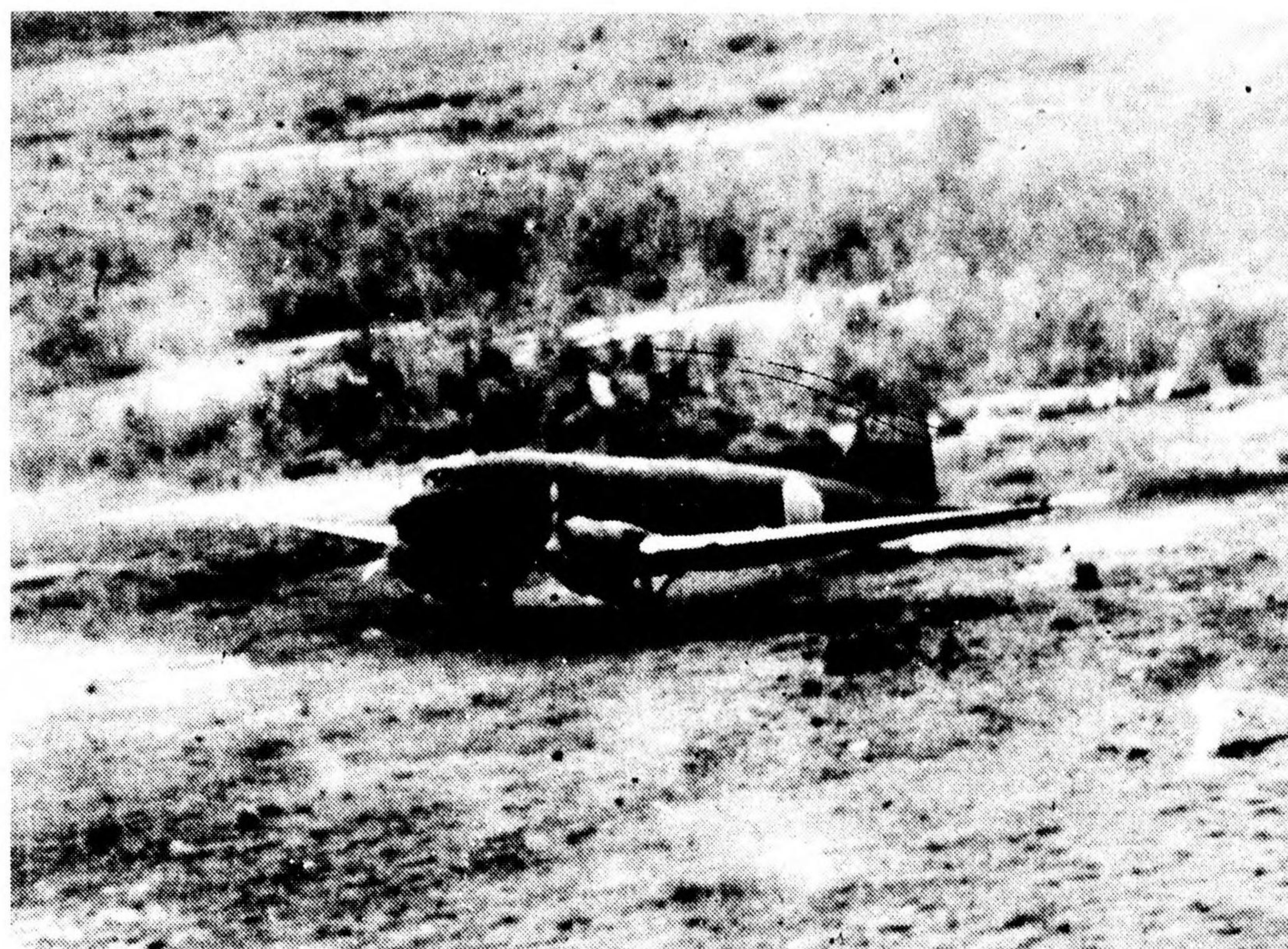
TABBY has three versions, the Model 22 cargo plane, the Model 22 transport plane and the Model 32 passenger transport. Differences between the three versions have not been determined exactly.

TABBY is being used by both the Japanese Navy and Army.

MODEL 32



TABBY



The Japanese have in their possession modifications of both the American DC-3 and the DC-2. The DC-2 version is known as TESS, probably obsolete now, and the DC-3 version is known as TABBY. TABBY and TESS have approximately the same length, but TABBY has a wing span of 95 feet as compared to a span of 85 feet for TESS.



R E S T R I C T E D

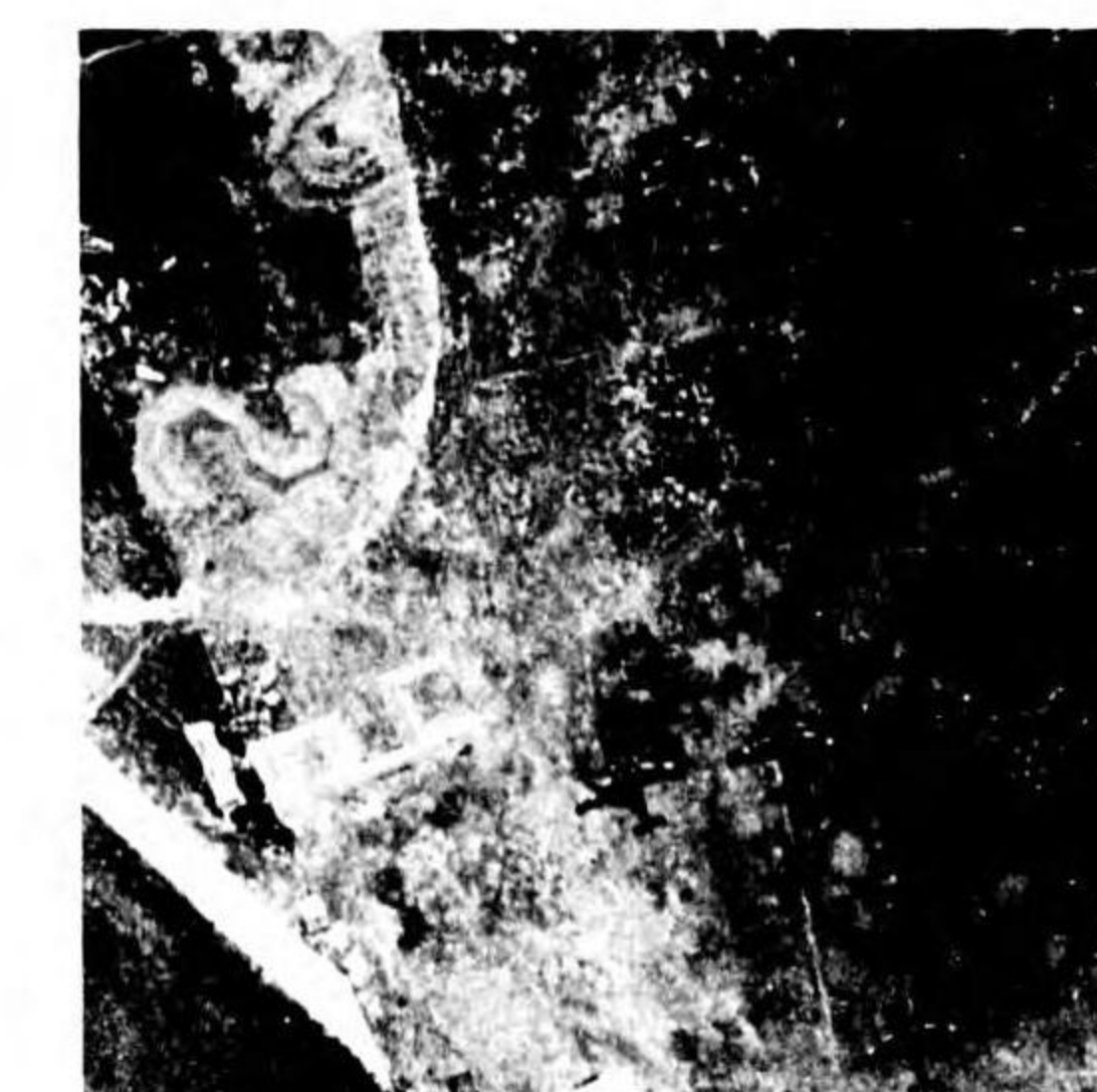


Photo Scale 1:5815



Photo Scale 1:4825

In the graveyard above are three fairly intact TABBY's as well as one demolished TABBY. Other twin-engine planes include four NELL's, three BETTY's and two FRANCES'.

Most noticeable changes of TABBY over the American DC-3 design are the addition of spinners and streamlined engine cowlings. In side view TABBY and TESS are both distinguished by a fairing of the vertical fin and rudder into the fuselage. Directly below for comparison are U.S. transport versions of the DC-3.



Photo Scale 1:17,815

"BETTY"

- MITSUBISHI OI
- LAND ATTACK
- S - 82'
- L - 64' 6"

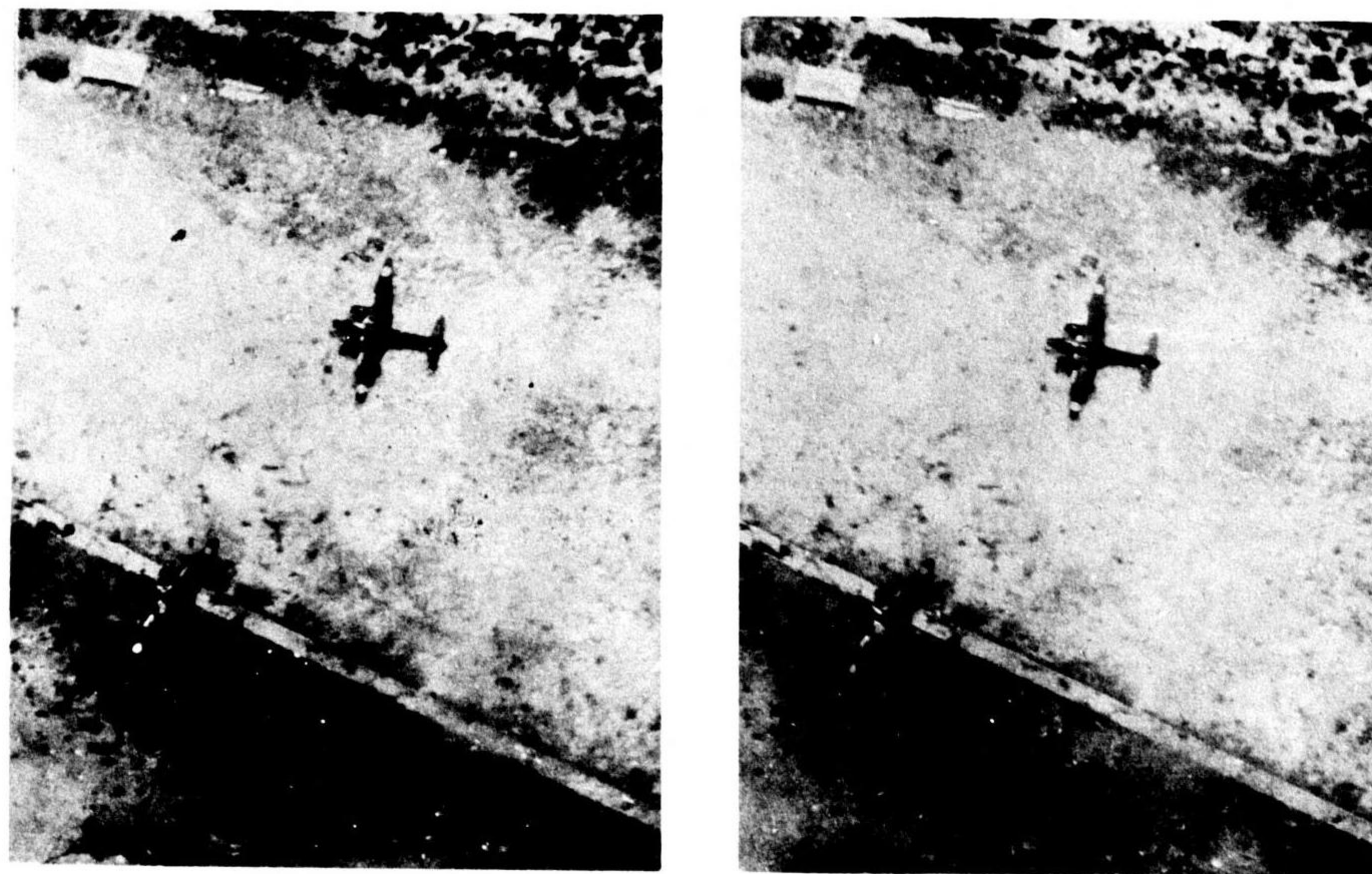
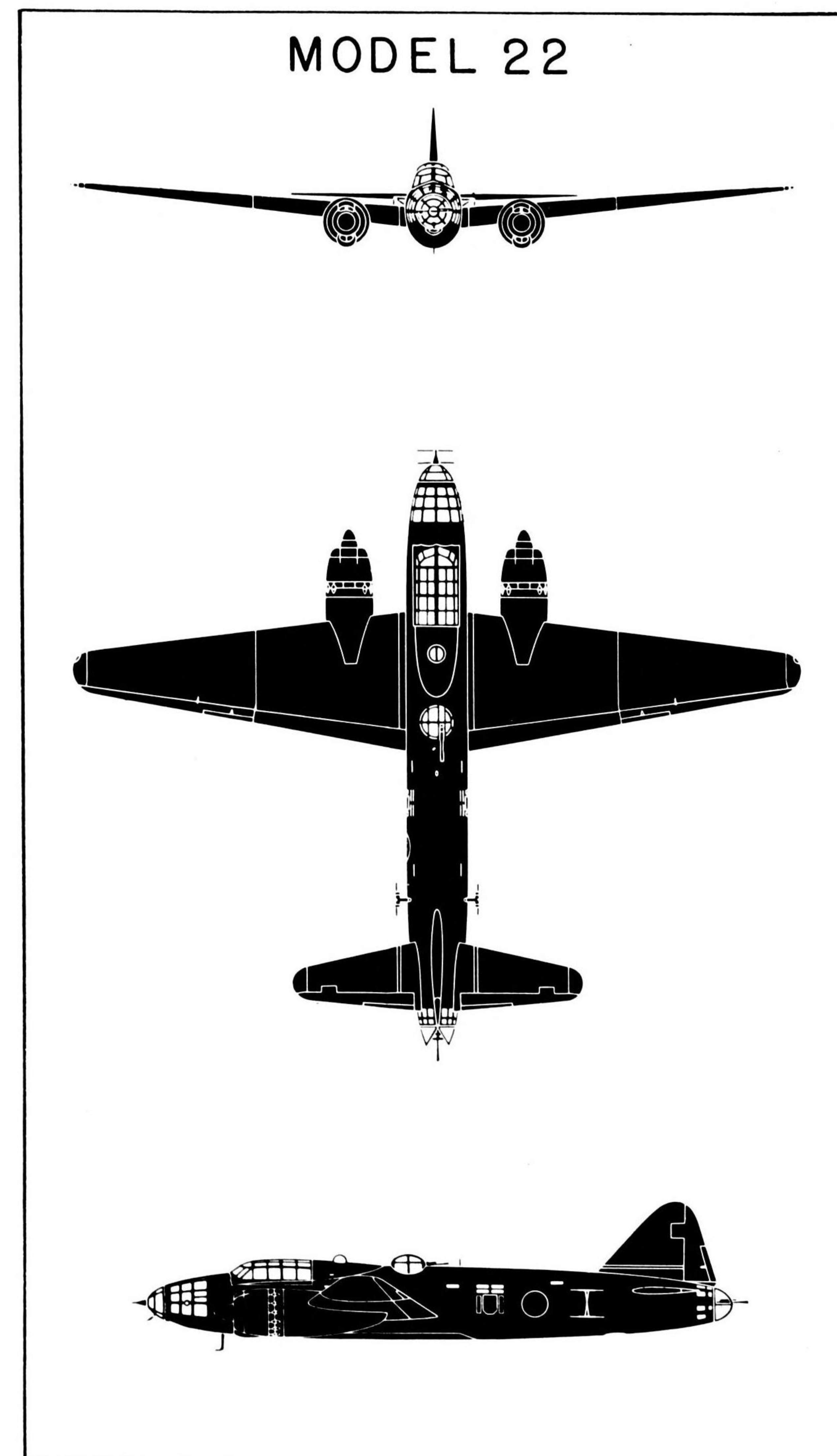


Photo Scale 1:2065

Identification Data

- Large transparent fuselage nose projects well forward of the engine nacelles.
- Tapered engine nacelles project well forward of leading edge of wing.
- Wing of thick root chord has moderate, even taper and rounded wing tips.
- Fat fuselage.
- Slim triangular tailplane has wide span, rounded tips.
- Conspicuous tail turret projects aft of tailplane.
- Triangular fin and rudder of wide chord.
- Ball turret at juncture of fuselage and trailing edge of wing.

BETTY is used frequently as a torpedo bomber. It is also used as a transport and as a reconnaissance plane.



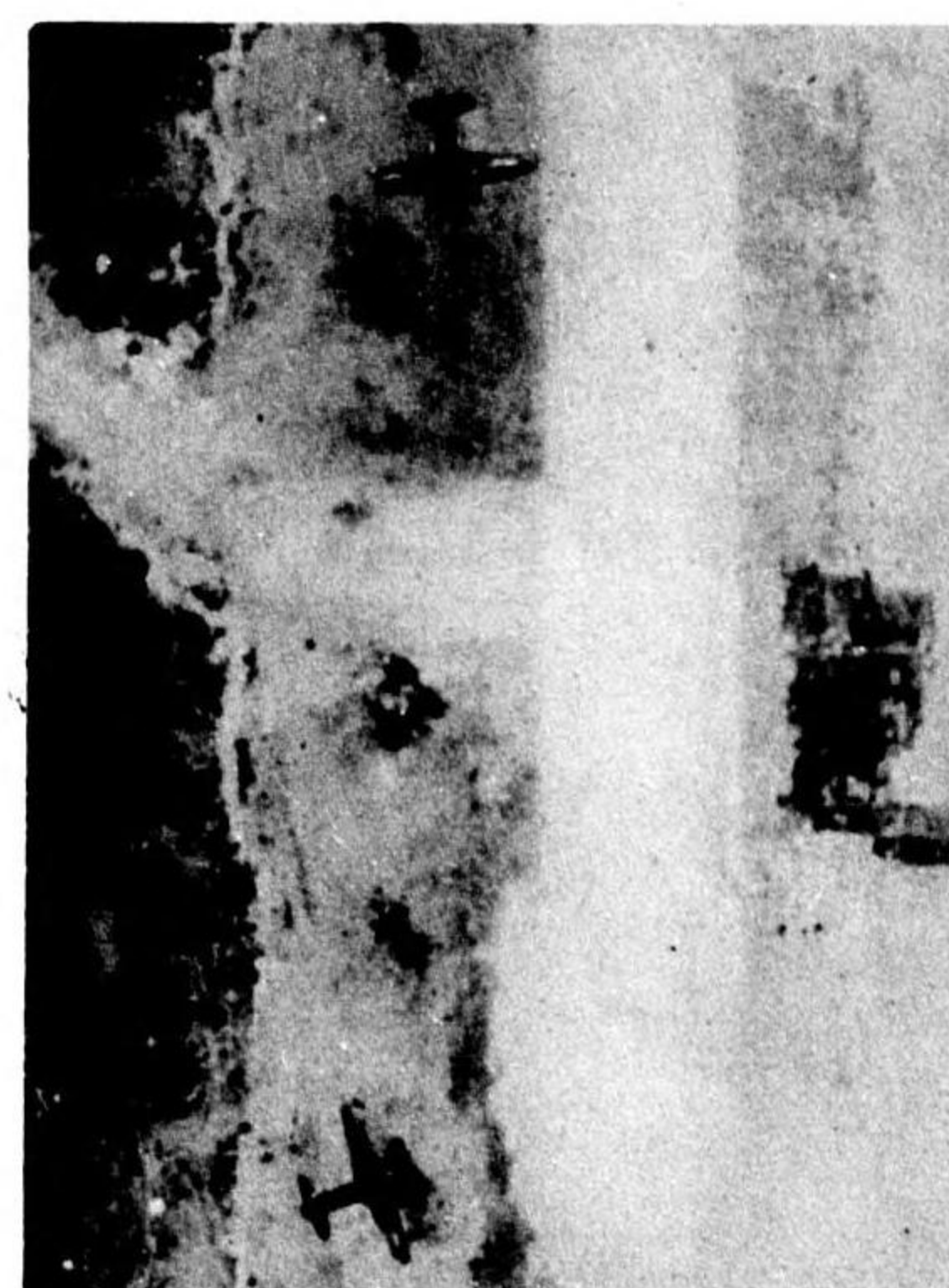
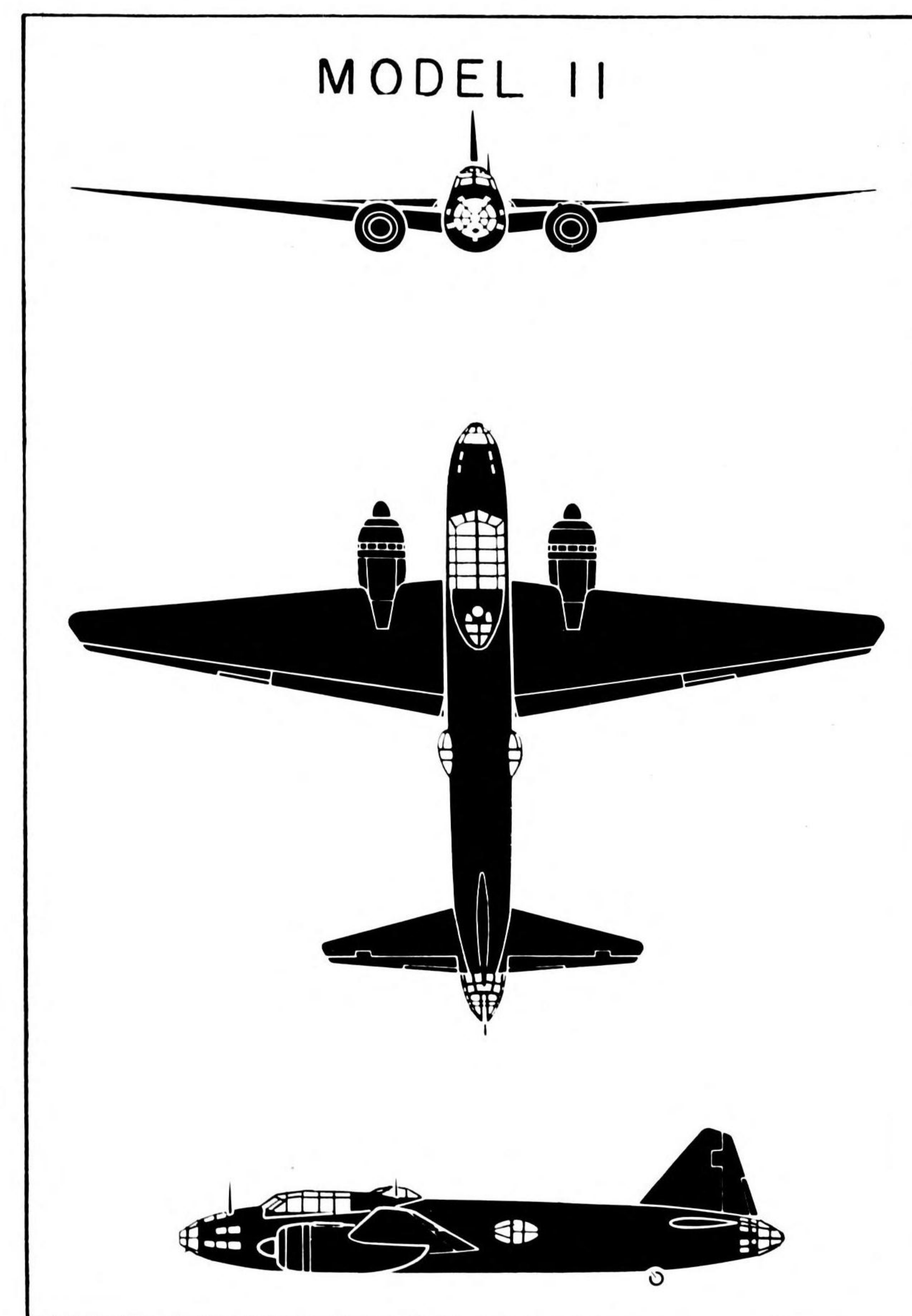
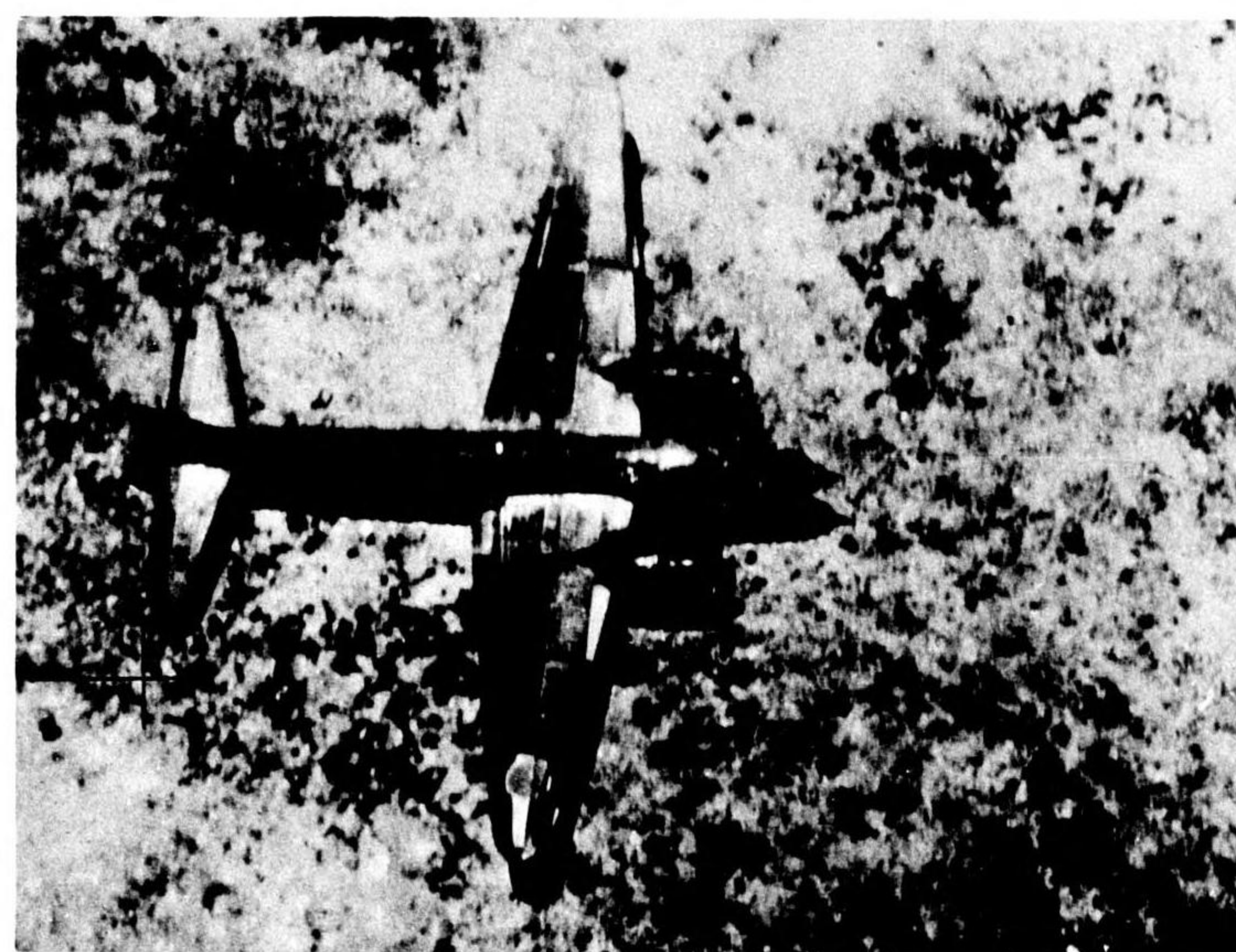


Photo Scale 1:4870



Photo Scale 1:5125



The silhouette above shows BETTY, Model II. Note the sharply cutback tips on the wing and tailplane. Other major differences from Model 22 include the presence of two side blisters and the absence of the dorsal turret at the trailing edge of the wing. On Model 22 there is a larger glass portion in the fuselage nose and the engine nacelles extend slightly further forward than on Model II. The tailplane and vertical fin and rudder are of slightly different design on the two models. Model II has a span of 82' and a length of 65' 7".

The photos at the left show the Model 22 BETTY. The large glass fuselage nose, the ball turret and the different wing and tailplane shapes show up well here. Note also the radar extending from the nose and from the side of the fuselage just forward of the tailplane.

BETTY

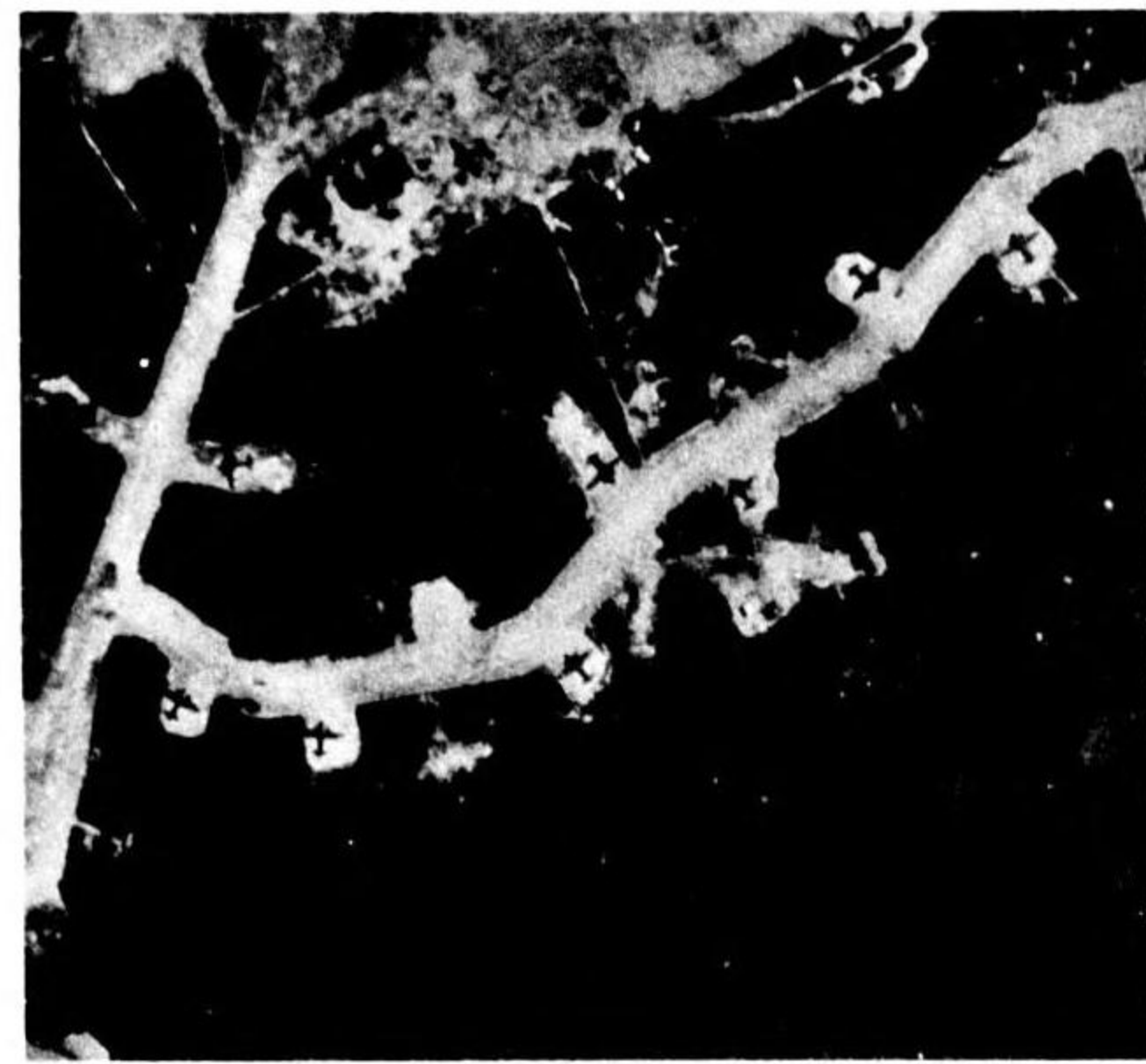
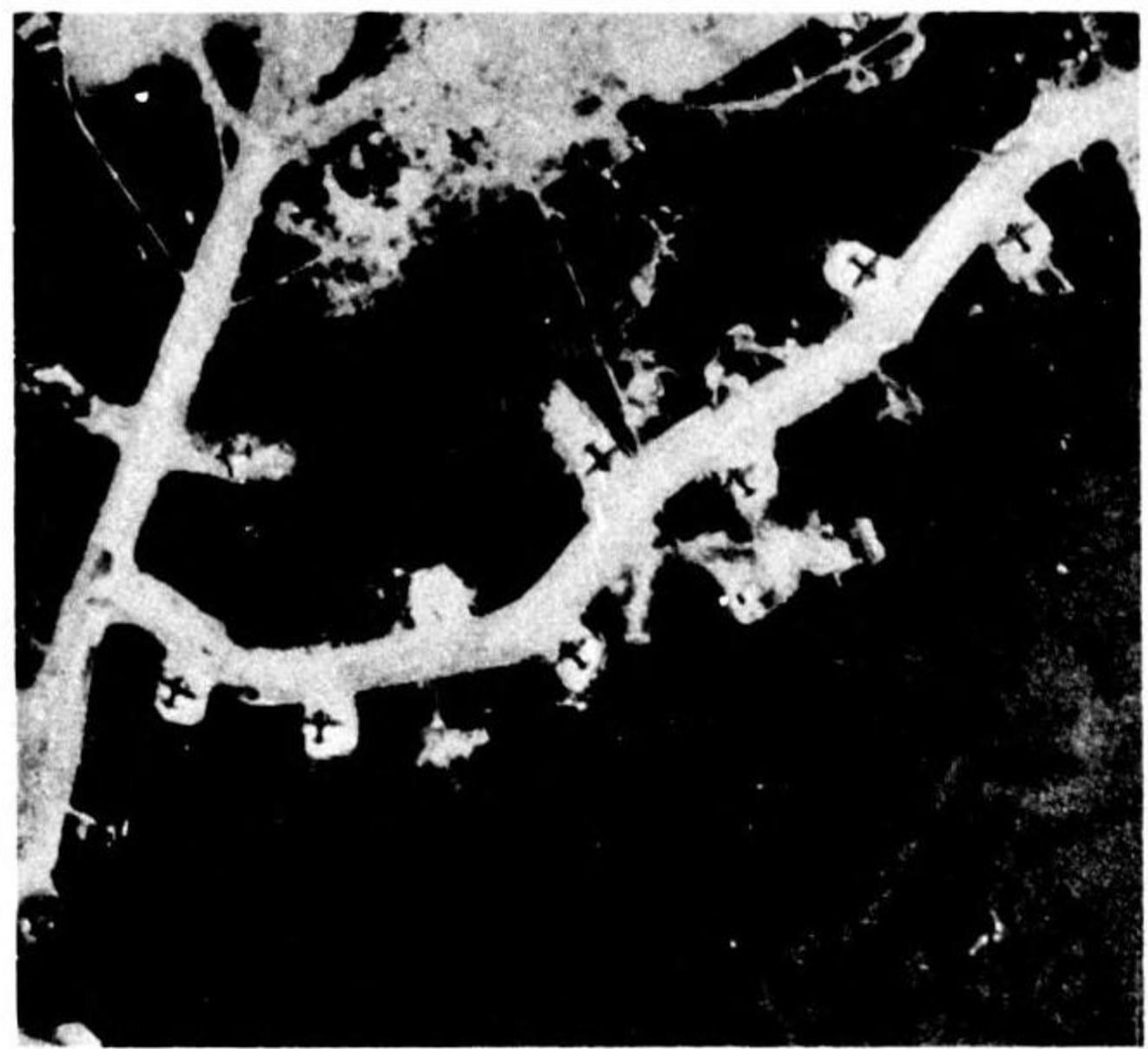


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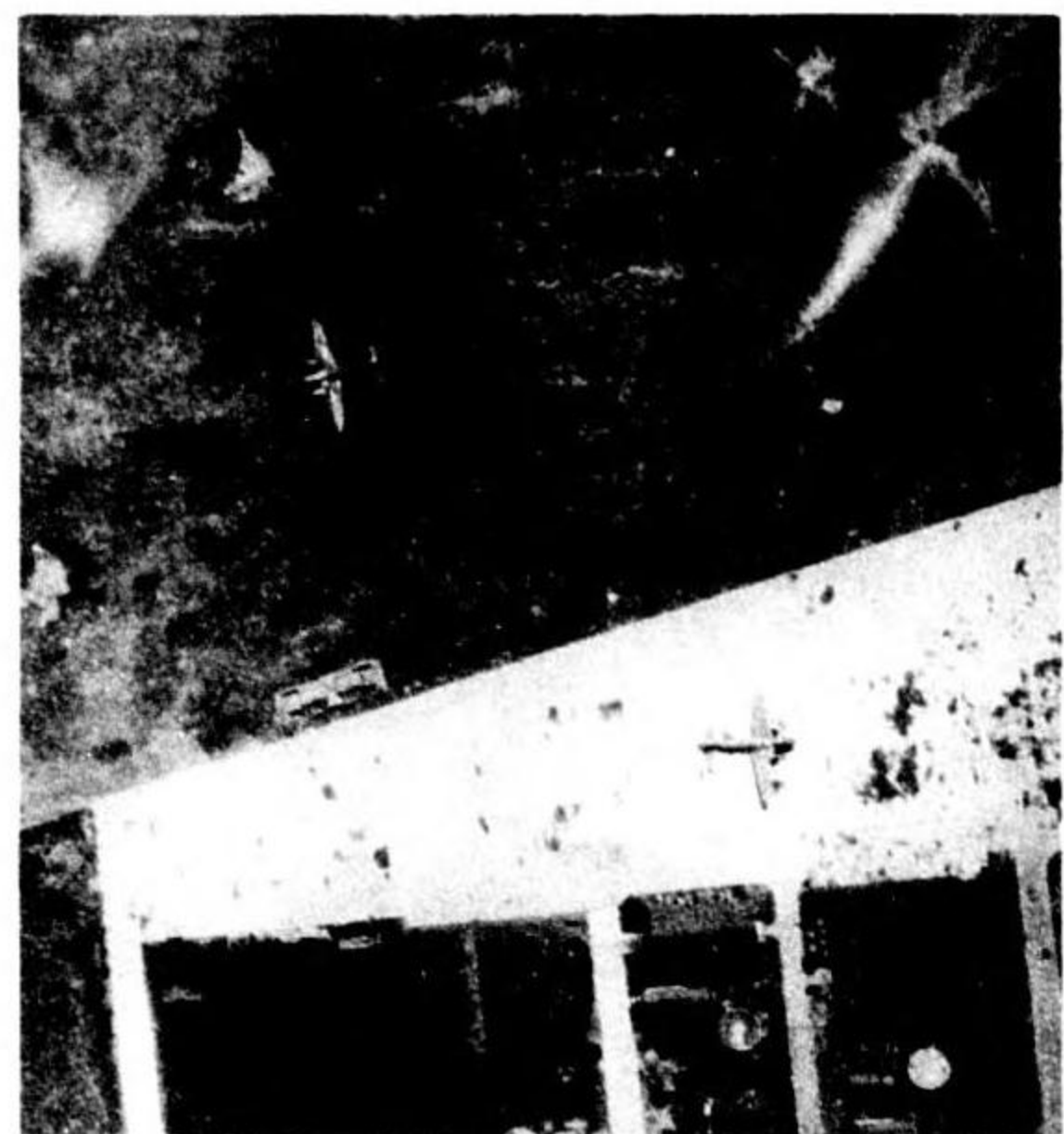


Photo Scale 1:4555

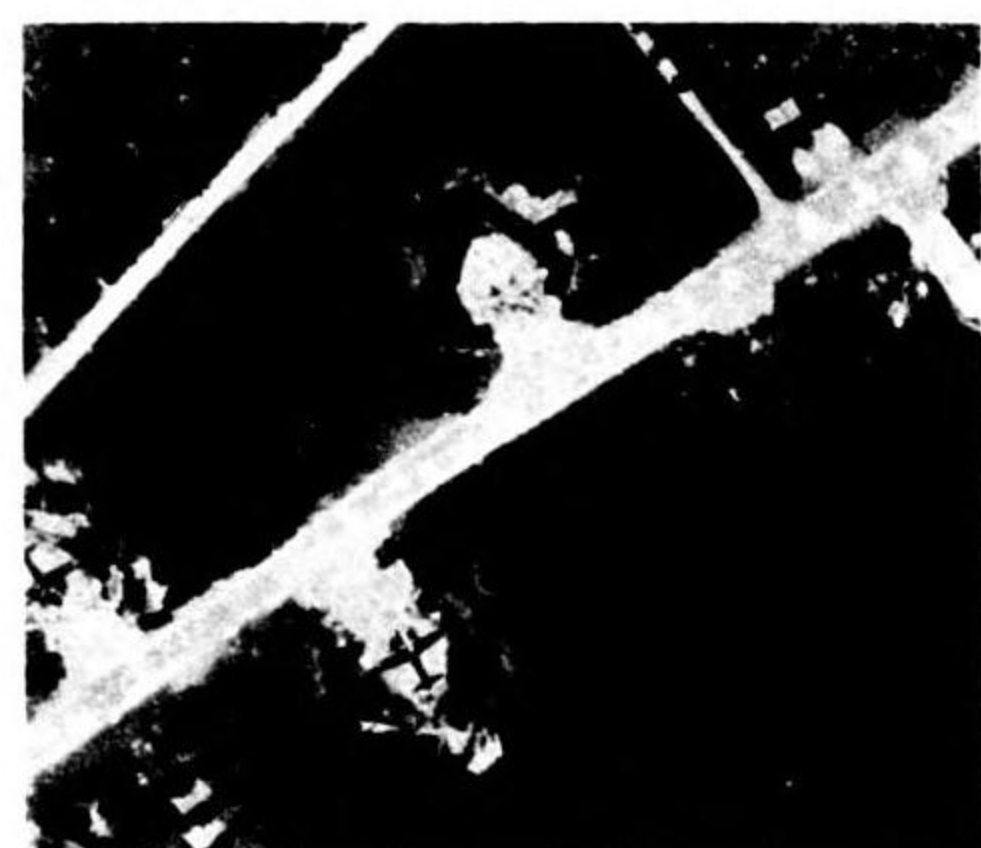


Photo Scale 1:6870

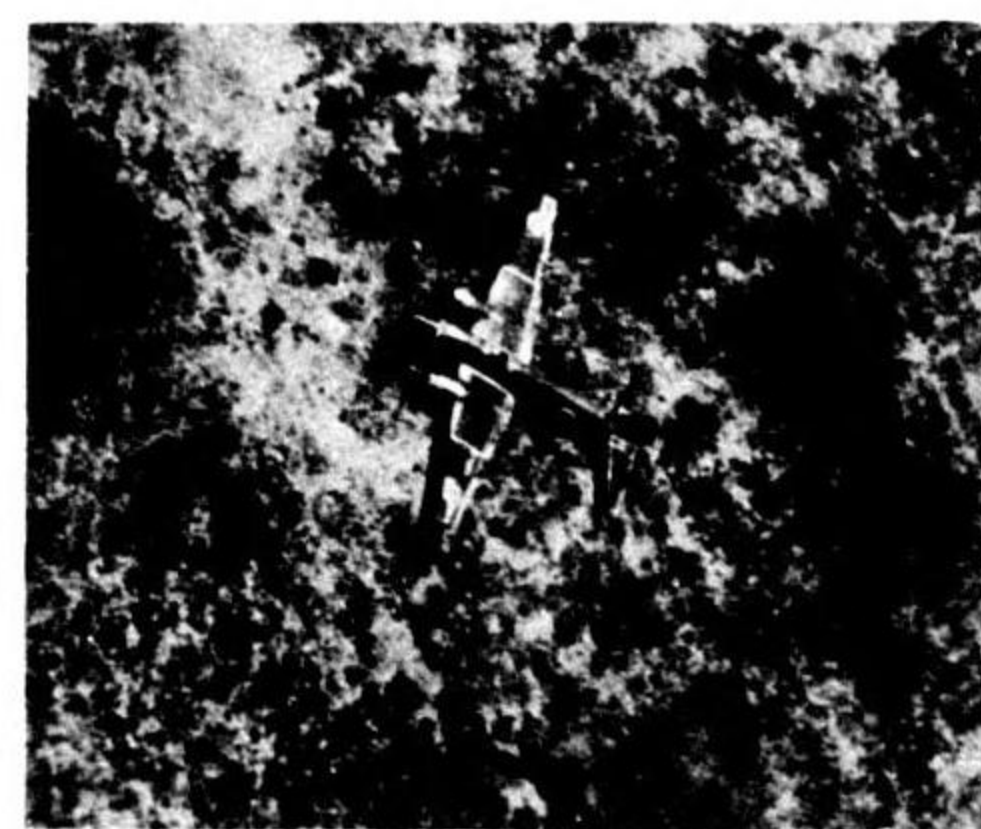
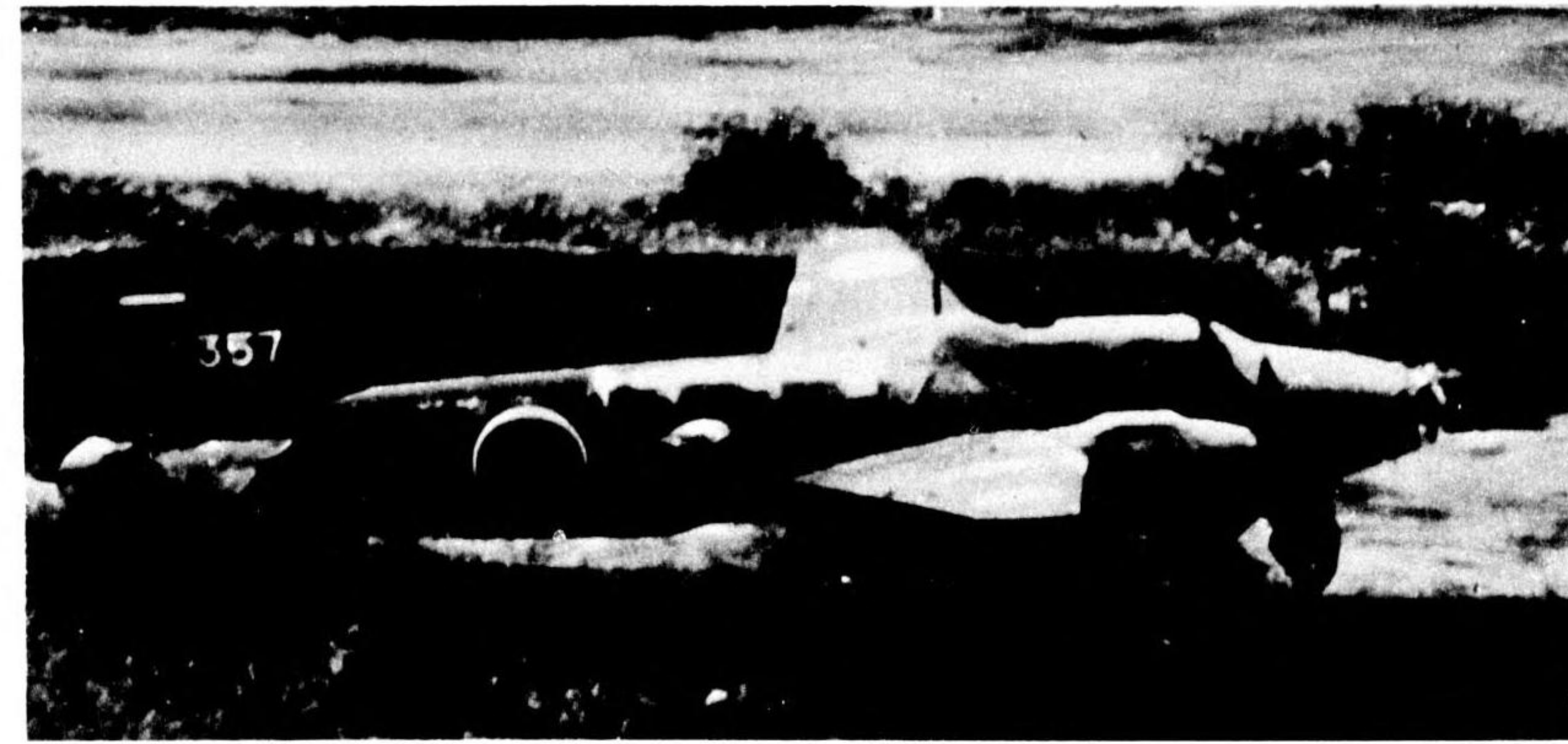


Photo Scale 1:1640



BETTY, due to its large size and distinctive shape, is easily identified at all scales. On this page are shown Model II BETTY's. Look for the protruding nose and engine nacelles, the tail turret and the fat fuselage. The slim, pointed tailplane has a wide span which is distinctive.

To differentiate SALLY or TOPSY from BETTY, note that the former two planes have fat, triangular tailplanes and considerably thicker wing root chords. Also the fuselage length between the wing and tailplane is noticeably greater on BETTY than on SALLY and TOPSY. BETTY has a longer nose, slimmer wing and tailplane and a fatter fuselage.

NELL, with similar wing span and shape, is distinguished by its twin fins and rudders, fatter tailplane, slim fuselage and very stubby engines.

- NAKAJIMA 96
- LAND ATTACK
- S-82'
- L-54'

"NELL"

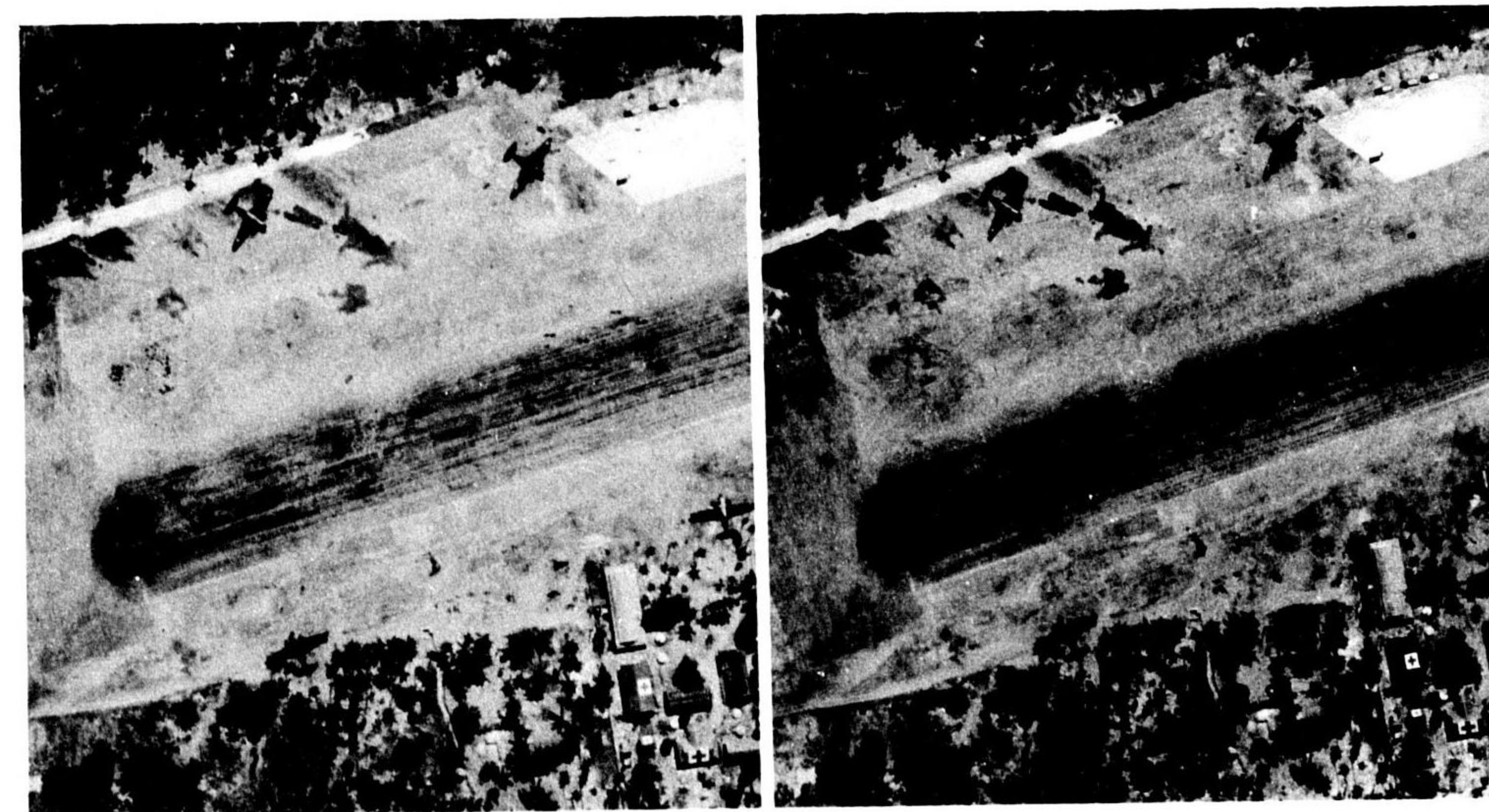
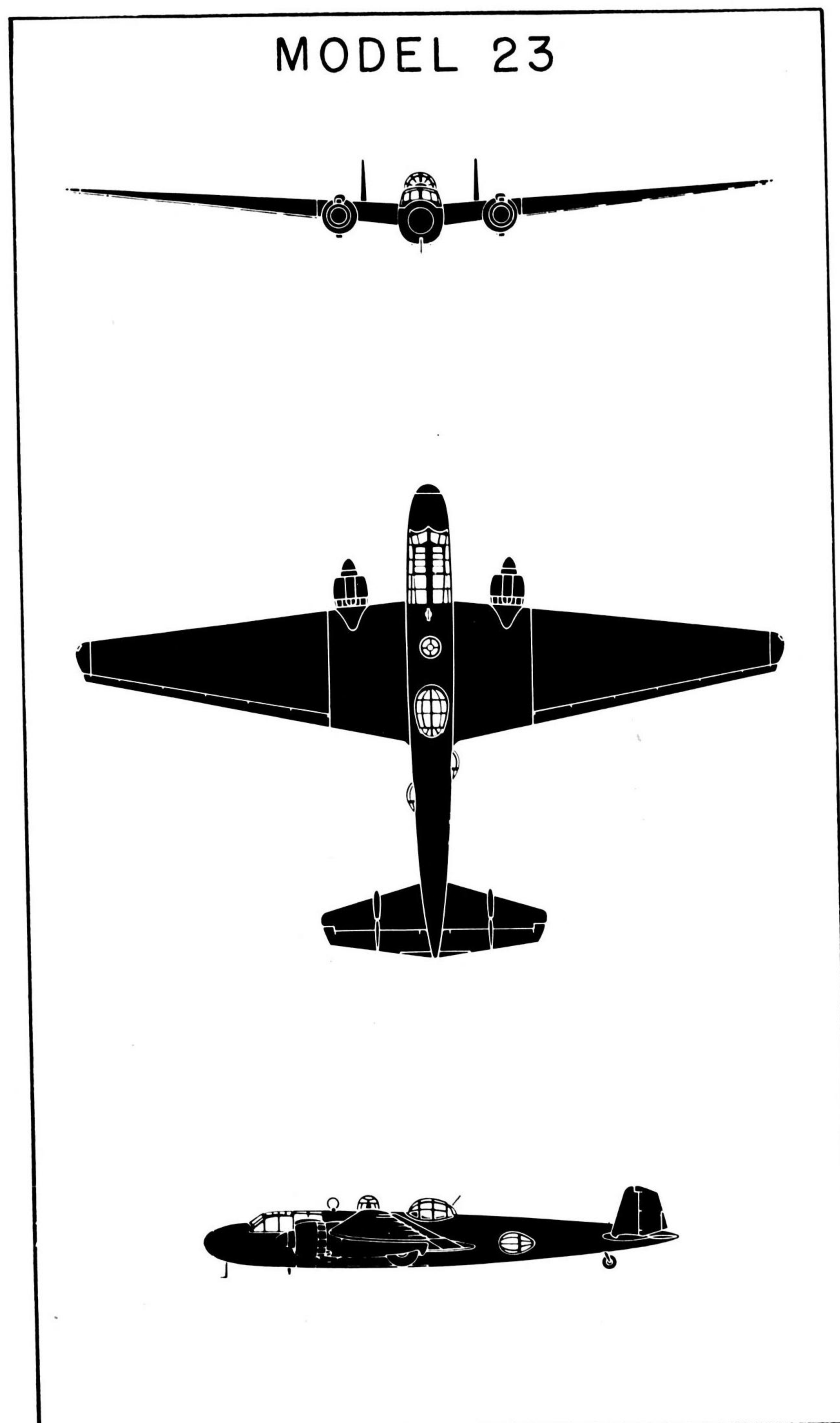


Photo Scale 1:4470

Identification Data

- Twin fins and rudders set on a large triangular tailplane.
- Solid fuselage nose projects well forward of stubby engine cowlings.
- Evenly tapered wing with squared tips.
- Slim fuselage.
- Large greenhouse forward of leading edge of wing, dorsal turret at trailing edge of wing.

NELL is also used as a torpedo bomber, as a transport and for reconnaissance work.

NELL

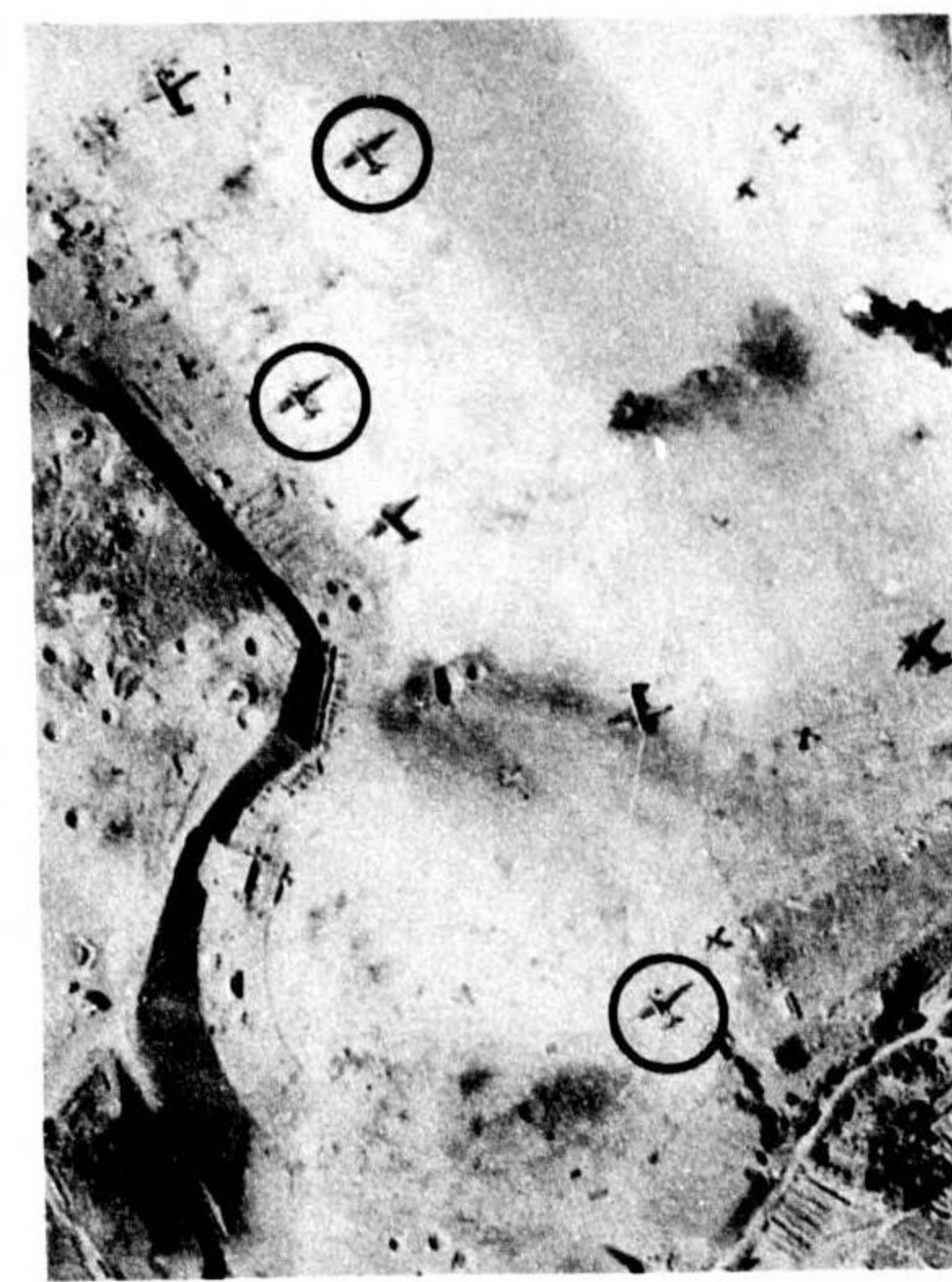


Photo Scale 1:7870

Above are three NELL's and four Model 22 BETTY's. The wing shapes and spans of the two planes appear similar but the stubby engines and slim, short fuselage distinguish NELL.



Photo Scale 1:1930

The first point to look for in identifying NELL is the location of twin fins and rudders inboard on the tailplane. If the fins and rudders are not visible then check the features noted above.

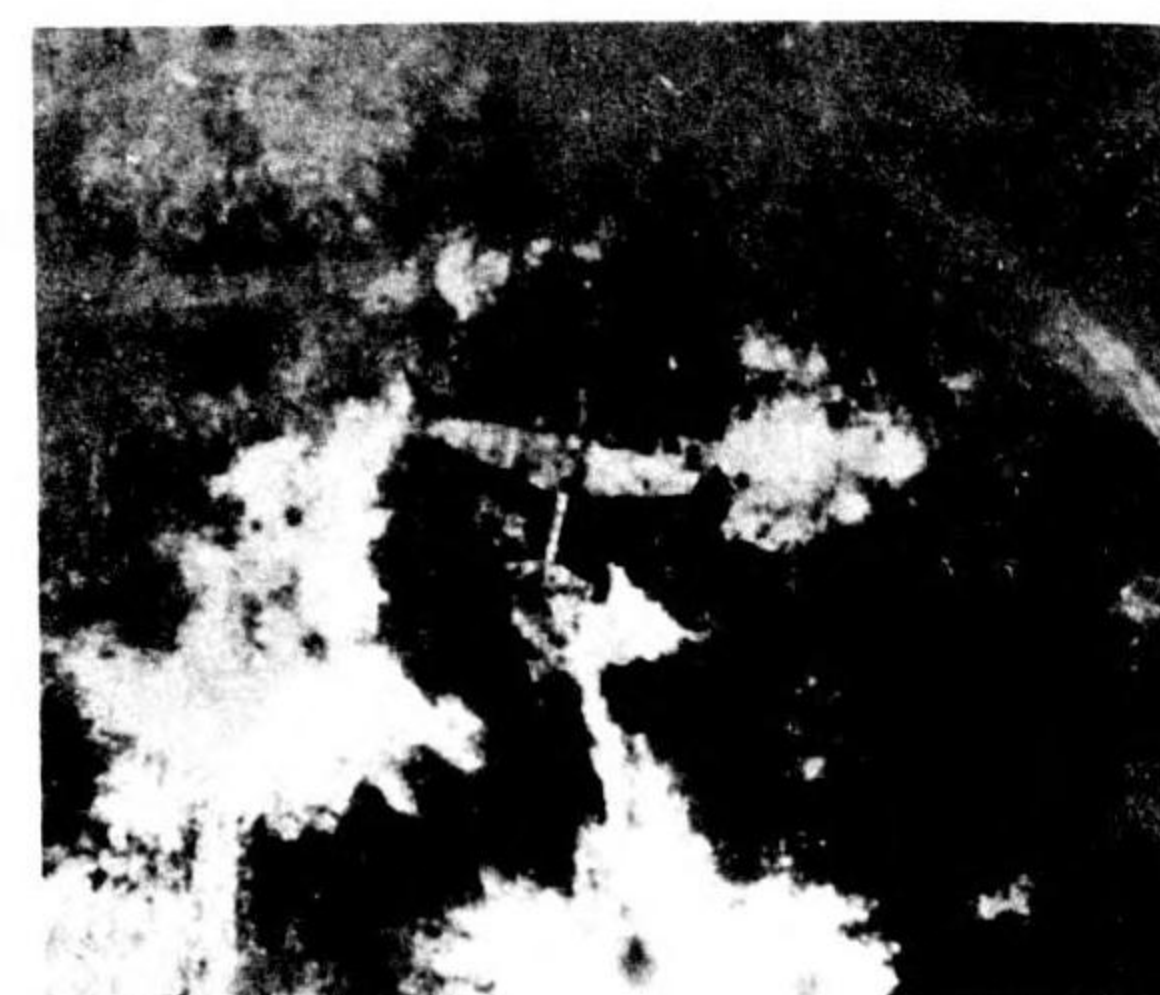


Photo Scale 1:1770



Photo Scale 1:4775

Three NELL's on a dispersal taxiway on Iwo Jima in the Kazan Retto. Other planes having twin fins and rudders and in use on a limited scale are LIZ, THELMA, and THALIA.

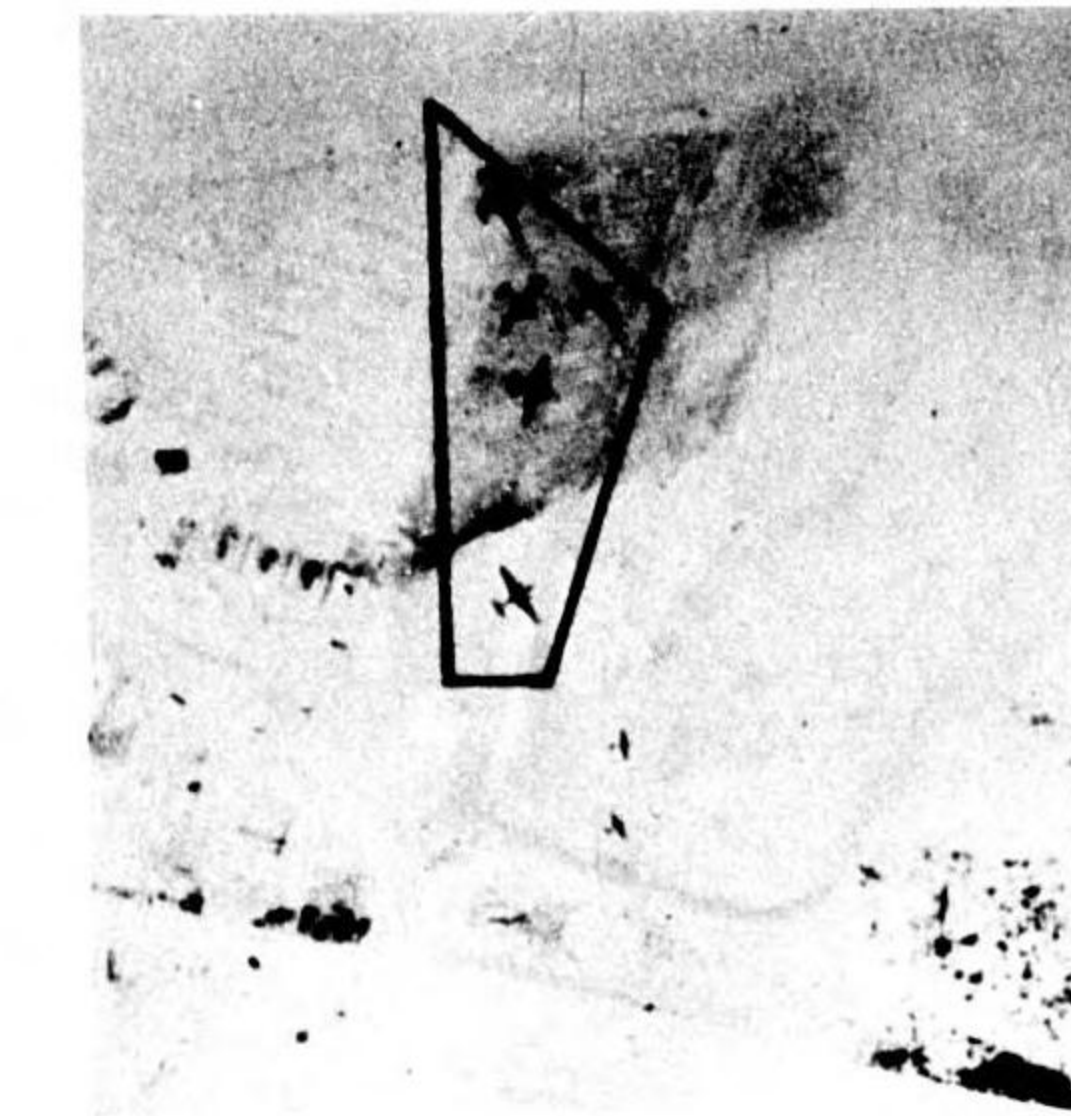


Photo Scale 1:9110

Five NELL's and three ZEKE's at Wake Island. Here where the twin fins and rudders are not visible the very slim fuselage, the stubby engines and the large size of the tailplane are distinguishing characteristics.

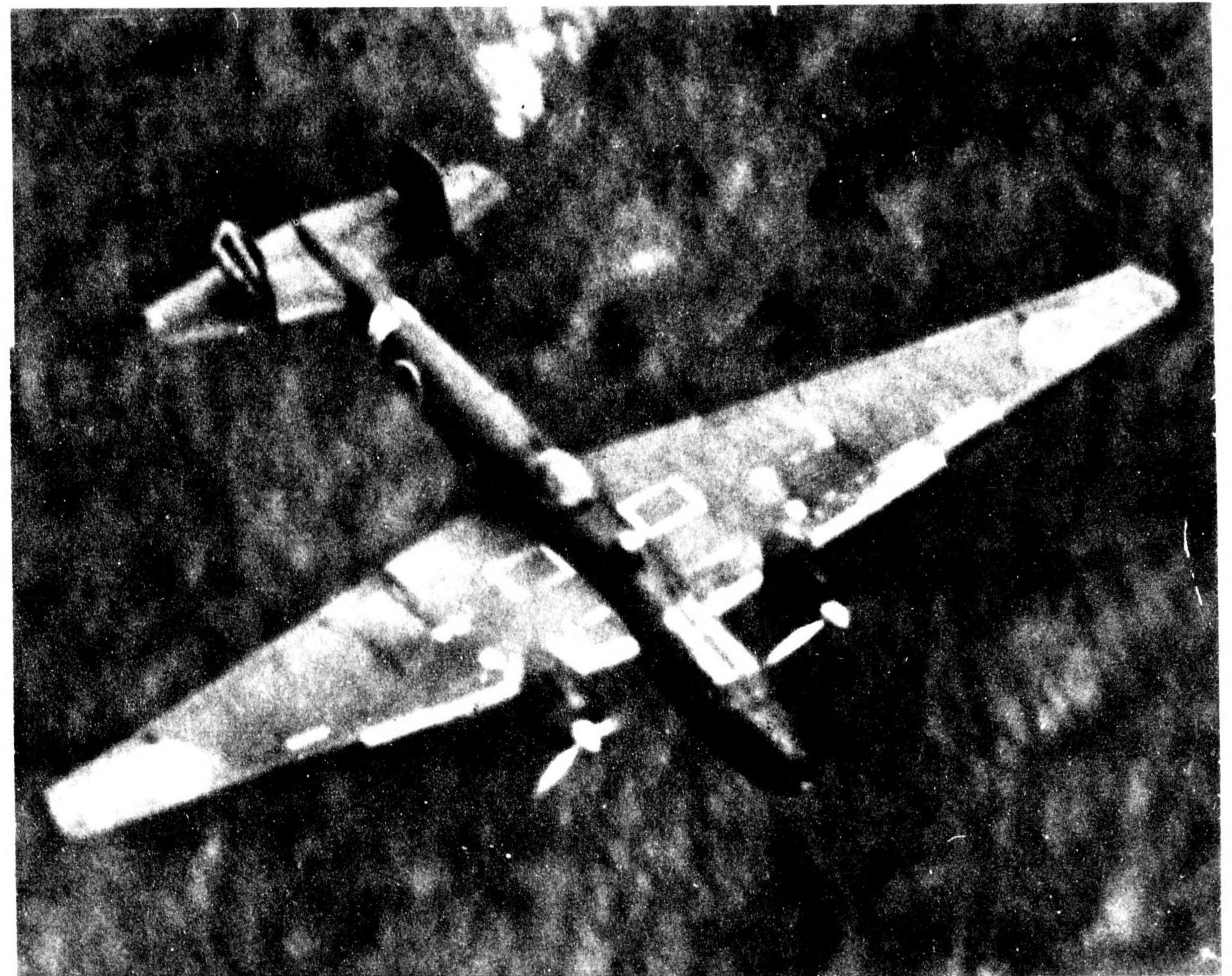
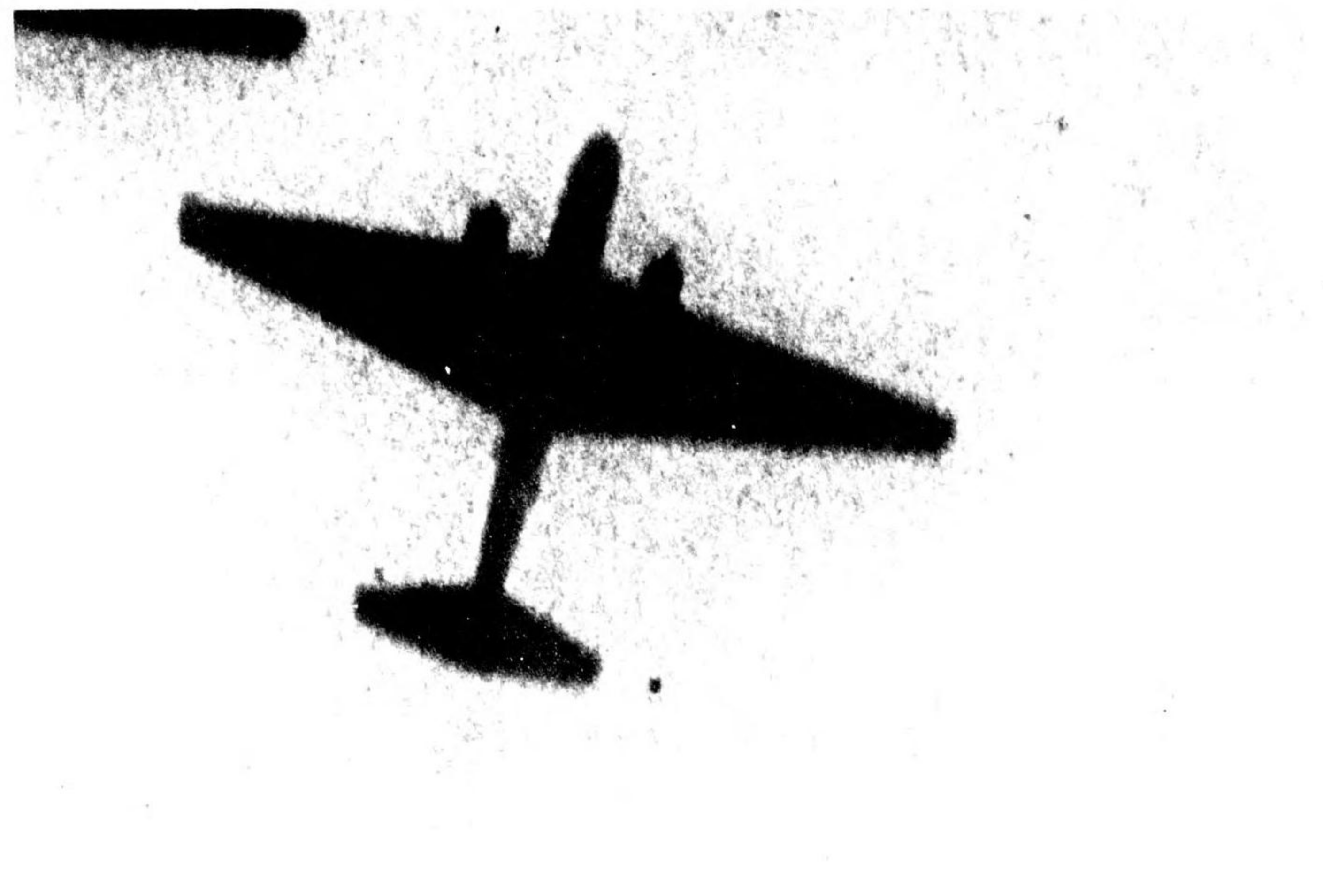


Photo Scale 1:9550

One NELL and five IRVING's at Guam in the Marianas. NELL has a solid fuselage nose in contrast to most bombers.

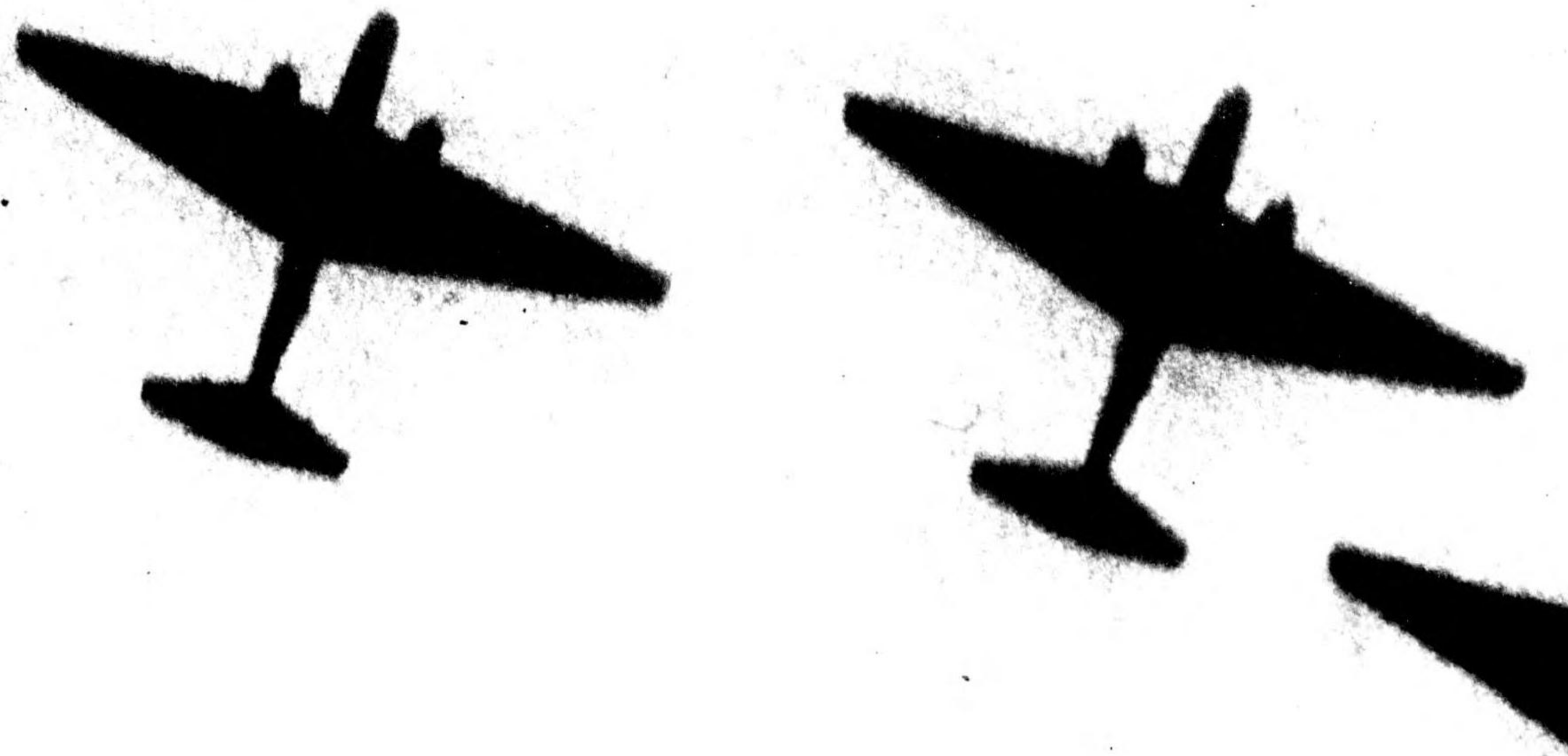
NELL

NELL is one of the oldest bombers in service, but improved models have appeared in combat areas recently. It was used extensively in the campaigns in the Philippines and the East Indies, sank the REPULSE and PRINCE OF WALES. NELL was the first Japanese plane to fly around the world.



NELL's in flight

In the top view of NELL shown above note the long, solid fuselage nose as contrasted with the stubby engine cowlings. This shows up well also in the bottom view silhouette at the left. Note the distinctive Junkers wing shape, slim fuselage and triangular tailplane. NELL is easily separated from bombers of similar size.



"SALLY"

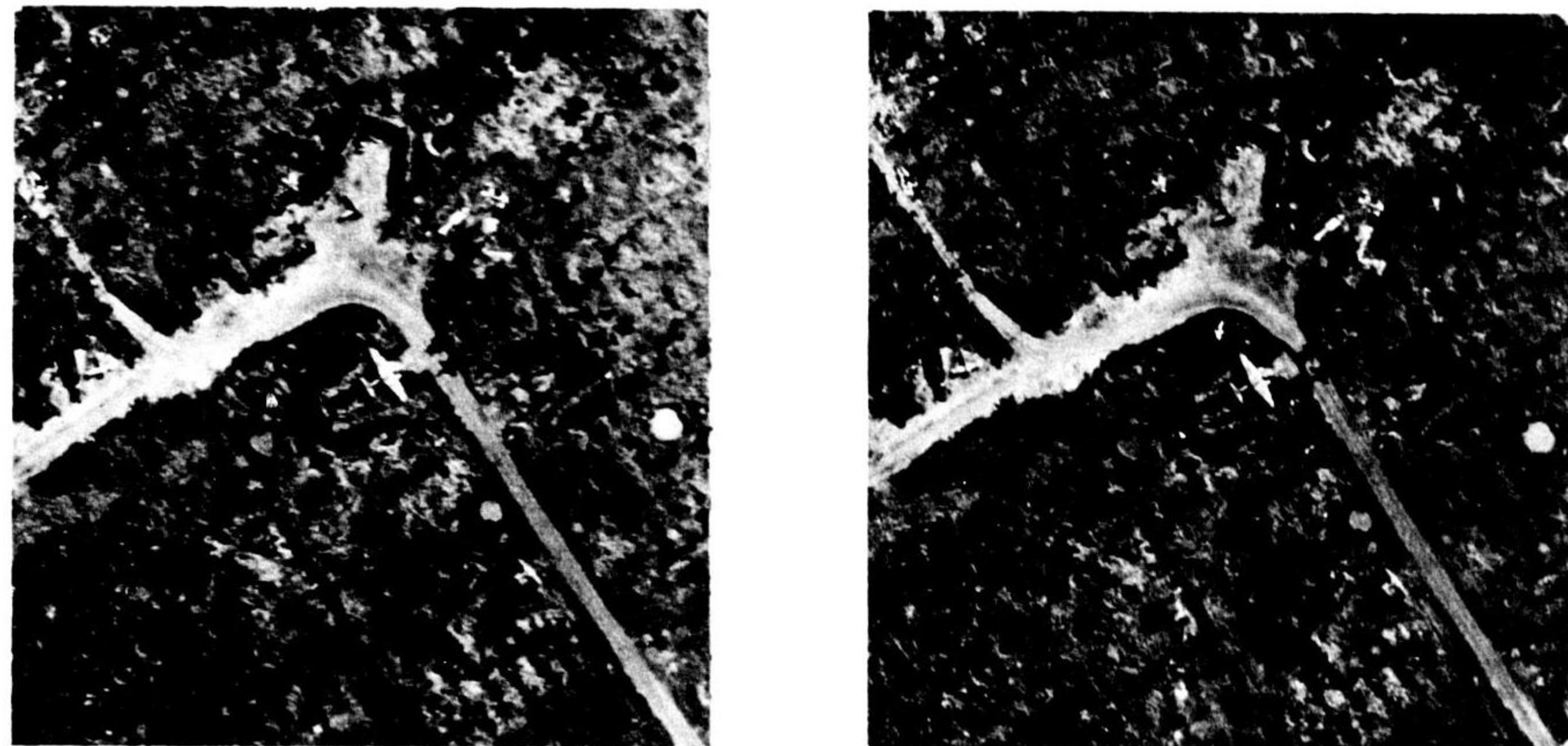


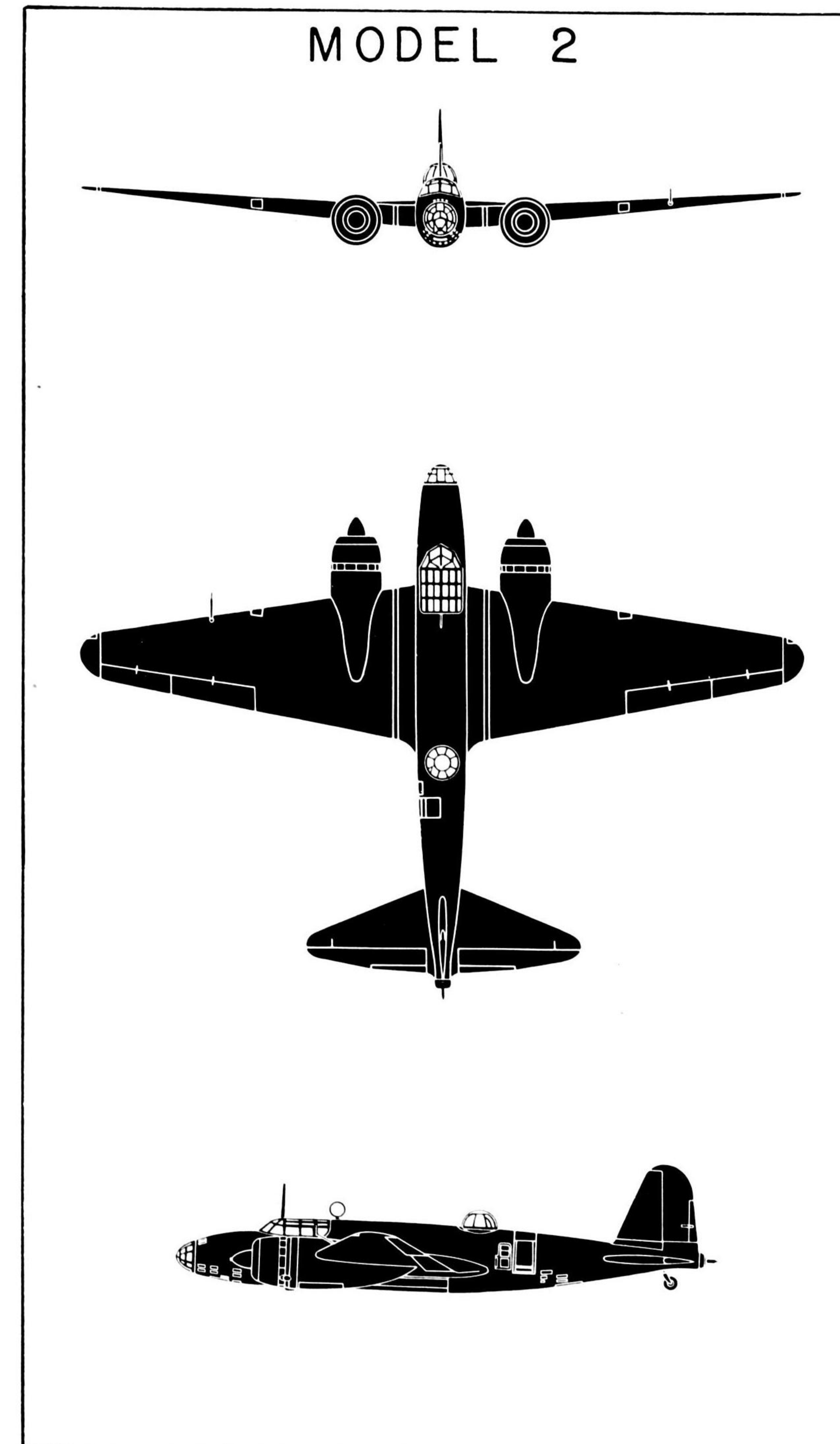
Photo Scale 1:4920

Identification Data

- Mid-wing monoplane.
- Wing tapered sharply on both leading and trailing edges.
- Wing set well back on fuselage toward tail plane.
- Transparent fuselage nose protrudes forward of engine nacelles.
- Fat triangular tail plane.
- High vertical fin and rudder.
- May have long rear cockpit or, in Model 2, a ball turret.
- Small tail gun.

SALLY is also used for reconnaissance work and as a torpedo bomber.

- MITSUBISHI 97
- MEDIUM BOMBER
- S-74' 8"
- L-52'



MODEL 2

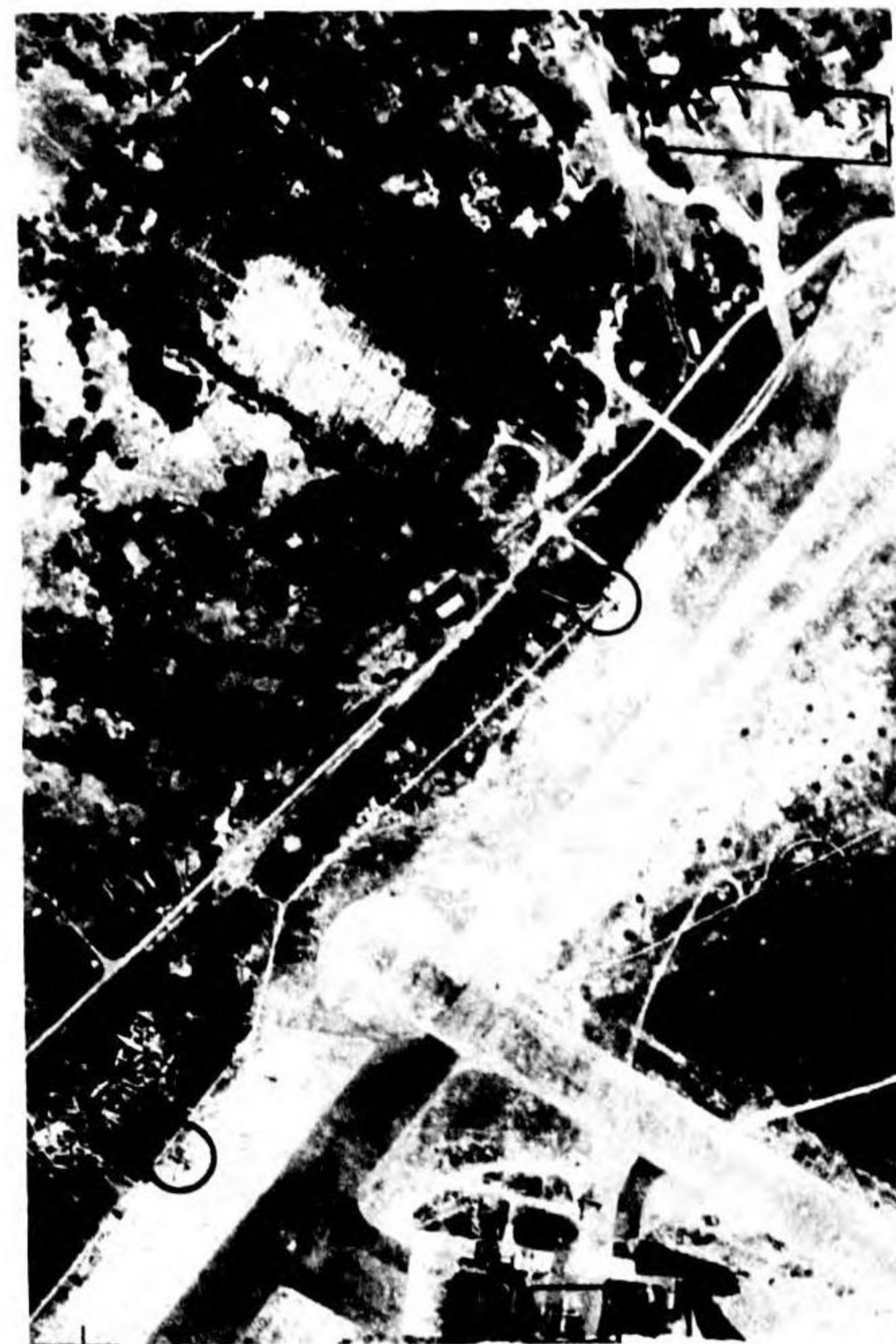
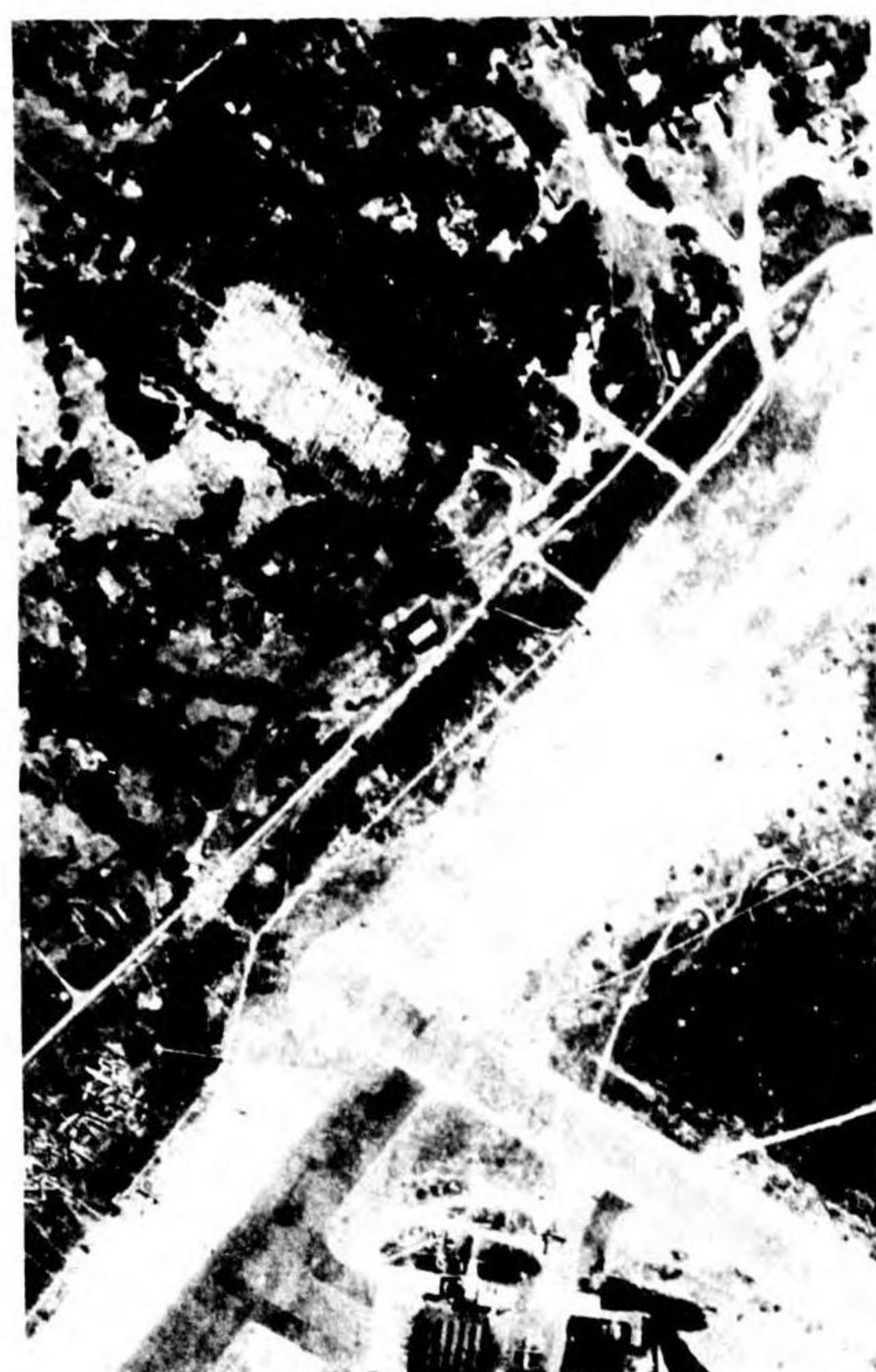


Photo Scale 1:9845

To distinguish SALLY from BETTY see page 2.06. Note the fat tailplane and the wing set well back toward the tailplane on the Model 1 SALLY's above.

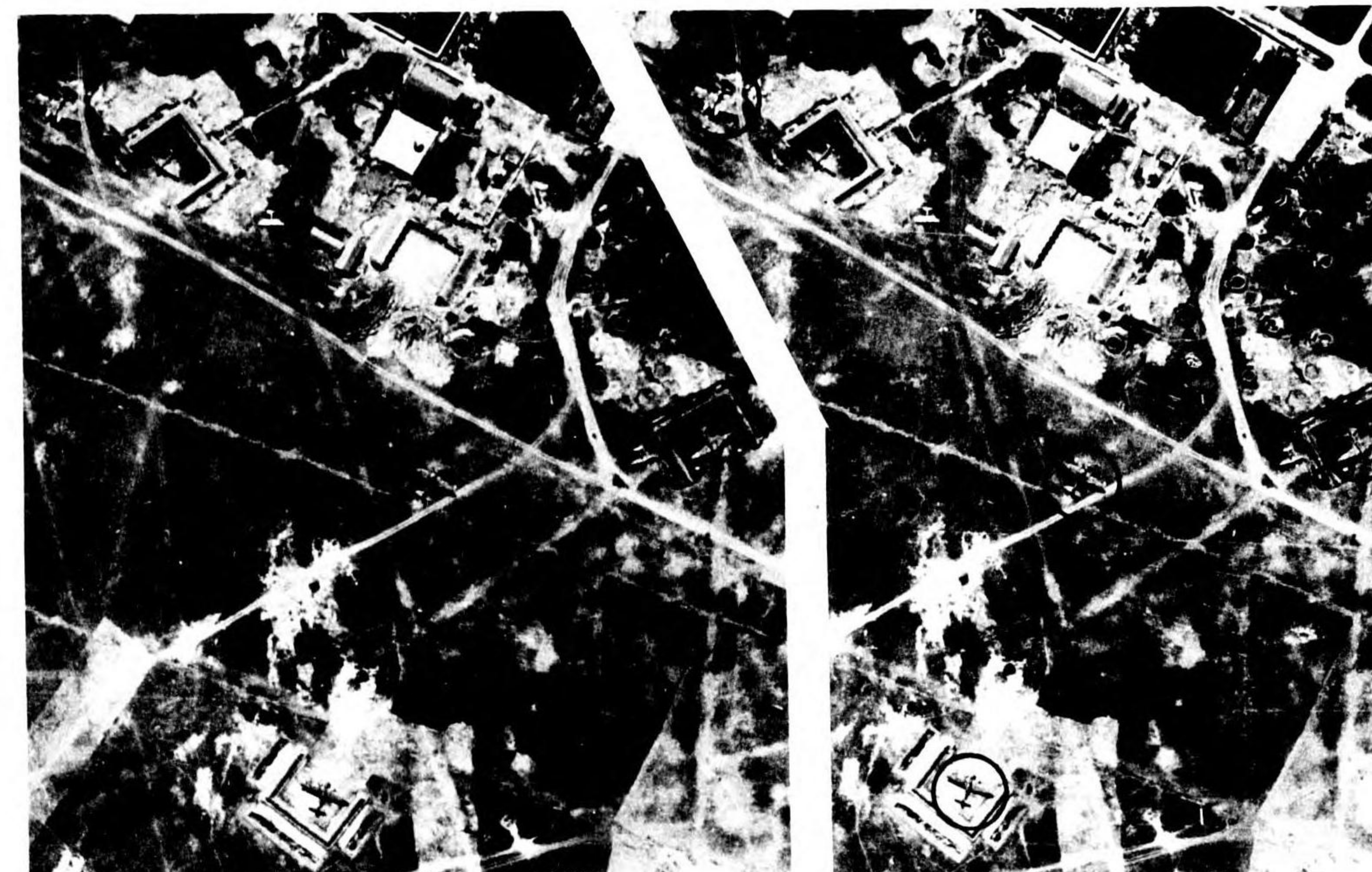


Photo Scale 1:4570

Three SALLY's, Model 2, in the lower portion of the stereo above. Note the dorsal turret. In the upper left hand corner is an earlier model SALLY with a dorsal greenhouse and one LILY.

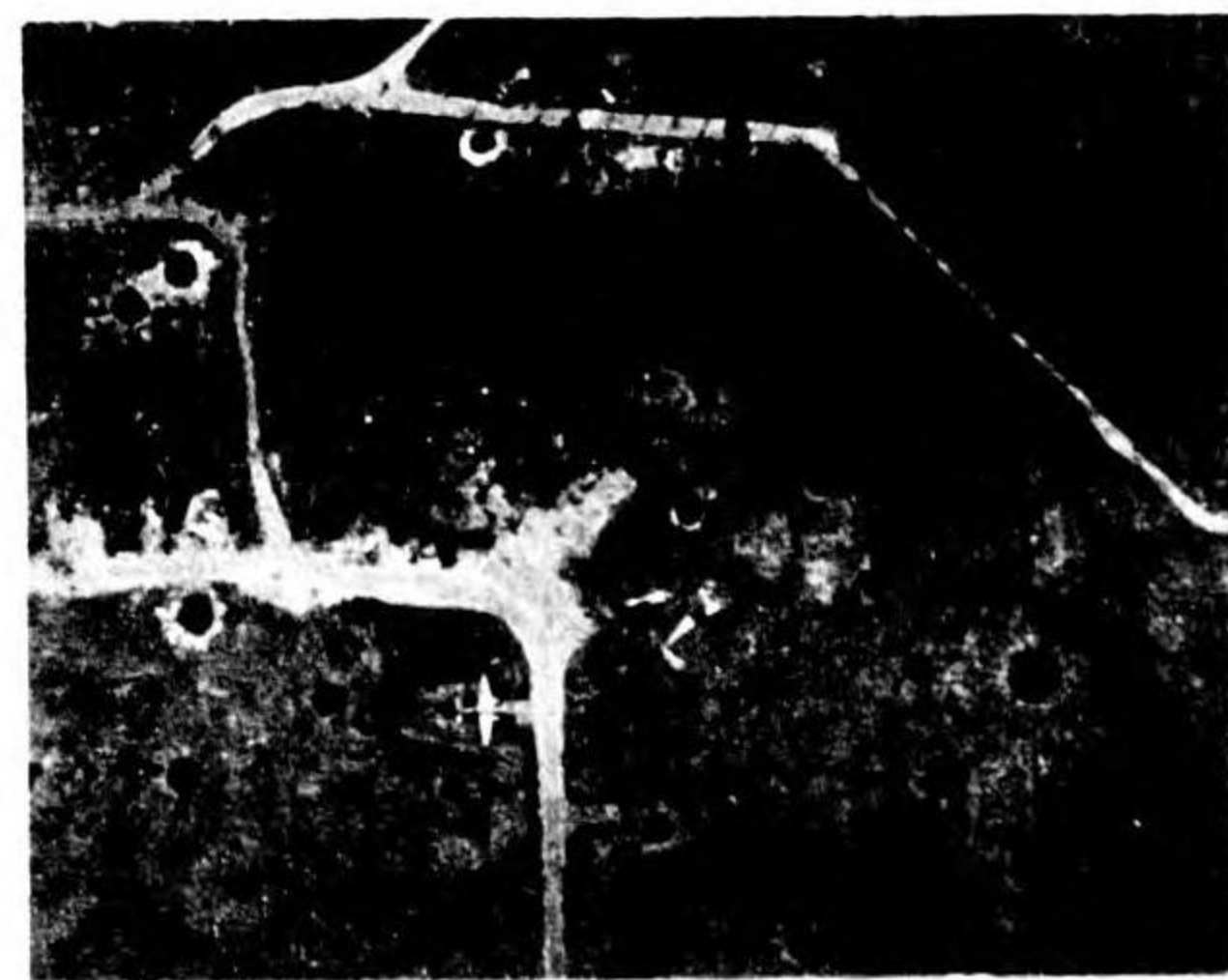


Photo Scale 1:7200

One SALLY, Model 2, and one OSCAR fighter at Boram-Newak.

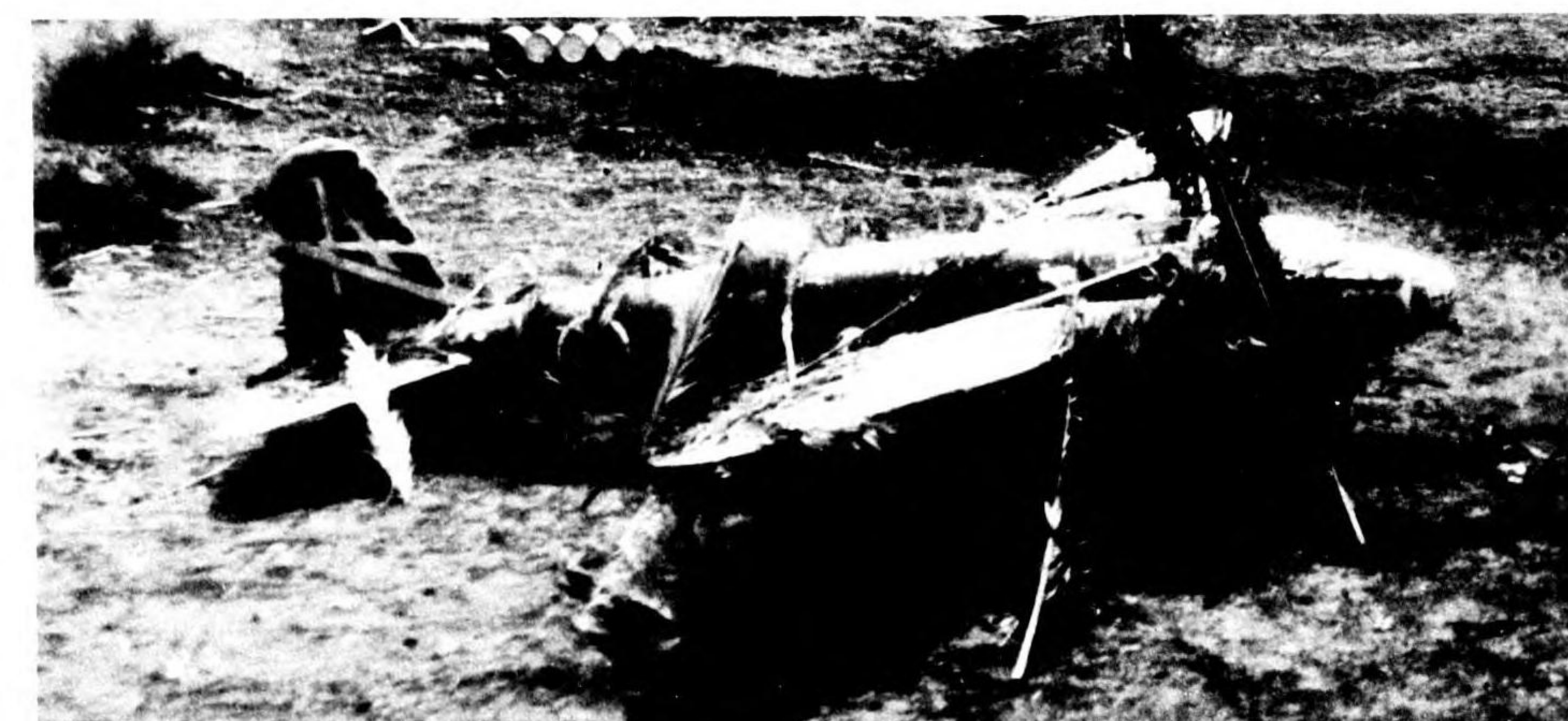


Photo Scale 1:7110

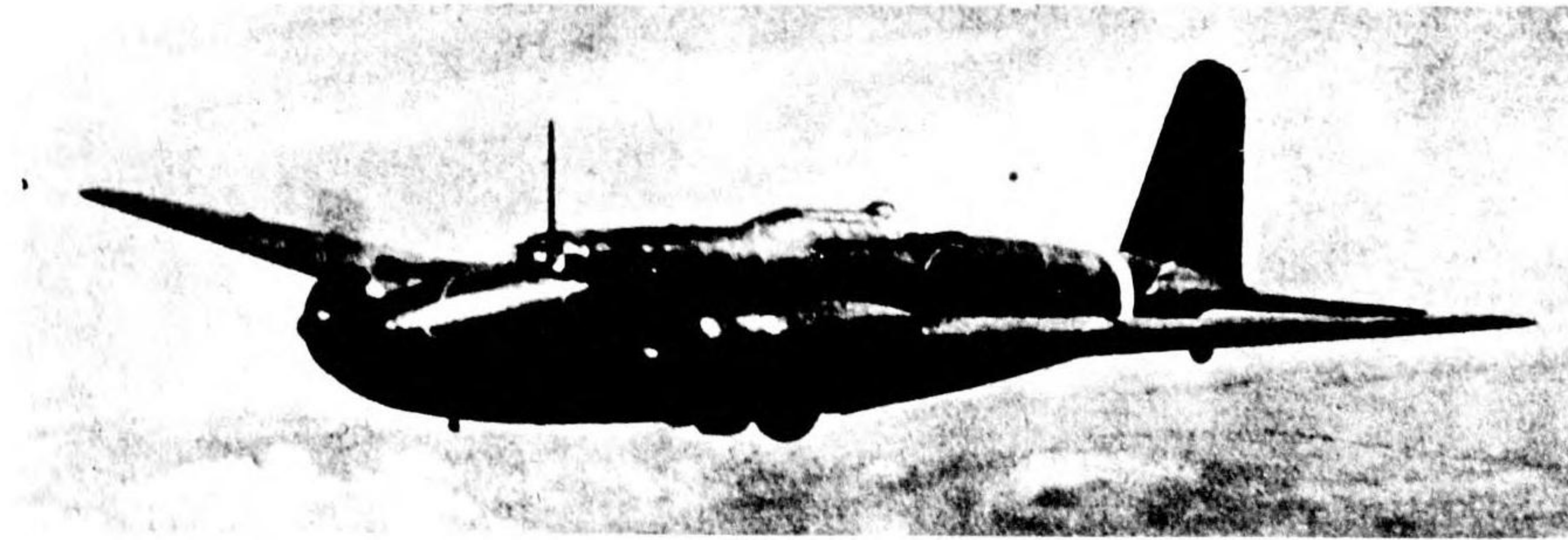
Three SALLY's above at Rapopo.



Photo Scale 1:7595



SALLY

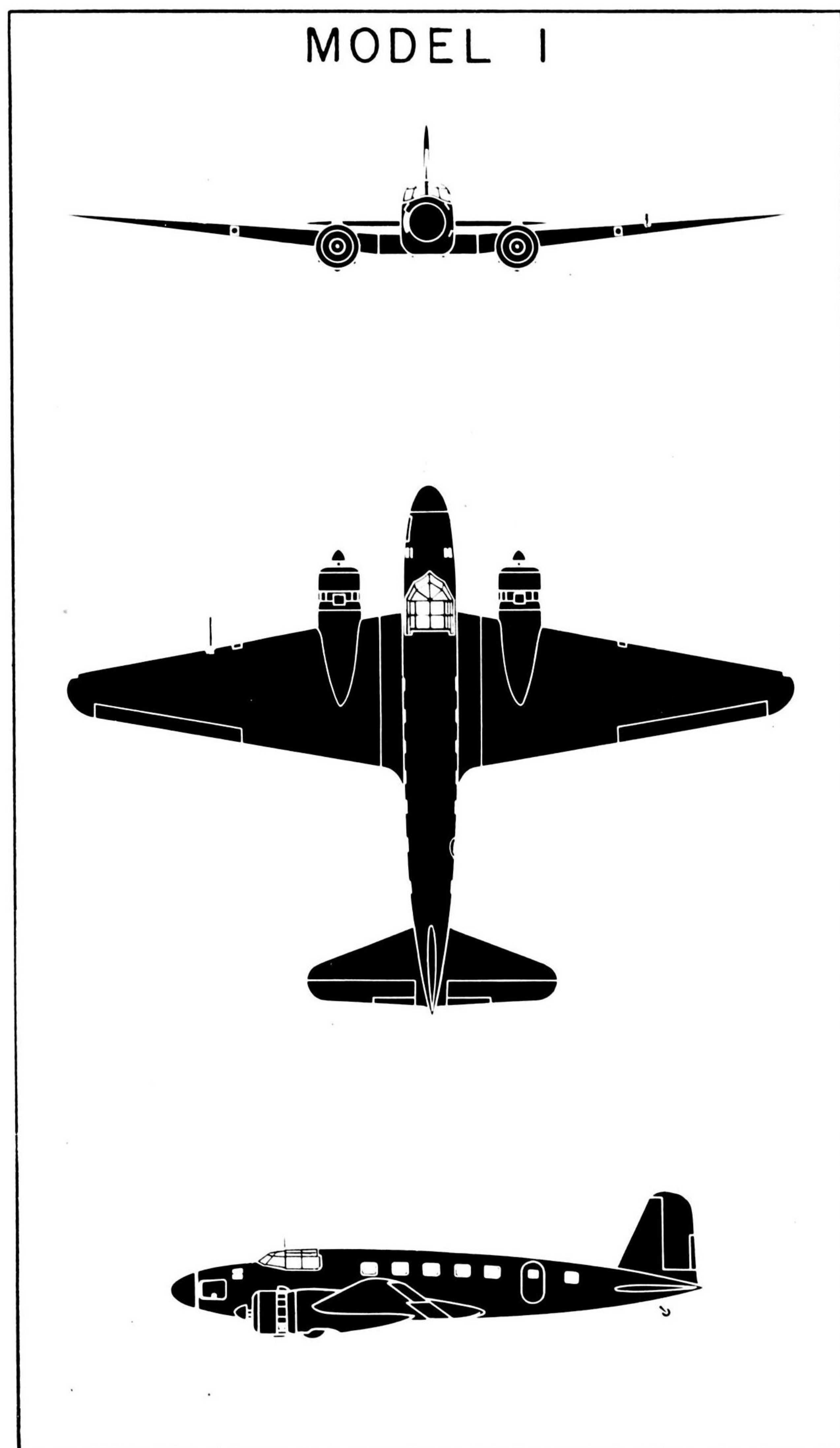


Above - SALLY, Model 1 with long rear dorsal cockpit. Two versions of Model 1 exist, one with a tail gun and one without a tail gun.

Below - SALLY, Model 2. A ball turret has replaced the rear cockpit. This is the model currently in use and was called Model 3 for some time. Model 2 has a fatter wing and larger tailplane than Model 1. The tall vertical fin and rudder is distinctive in both models.



- MITSUBISHI 100
- TRANSPORT
- S-74' 2"
- L-52' 10"



R E S T R I C T E D

"TOPSY"

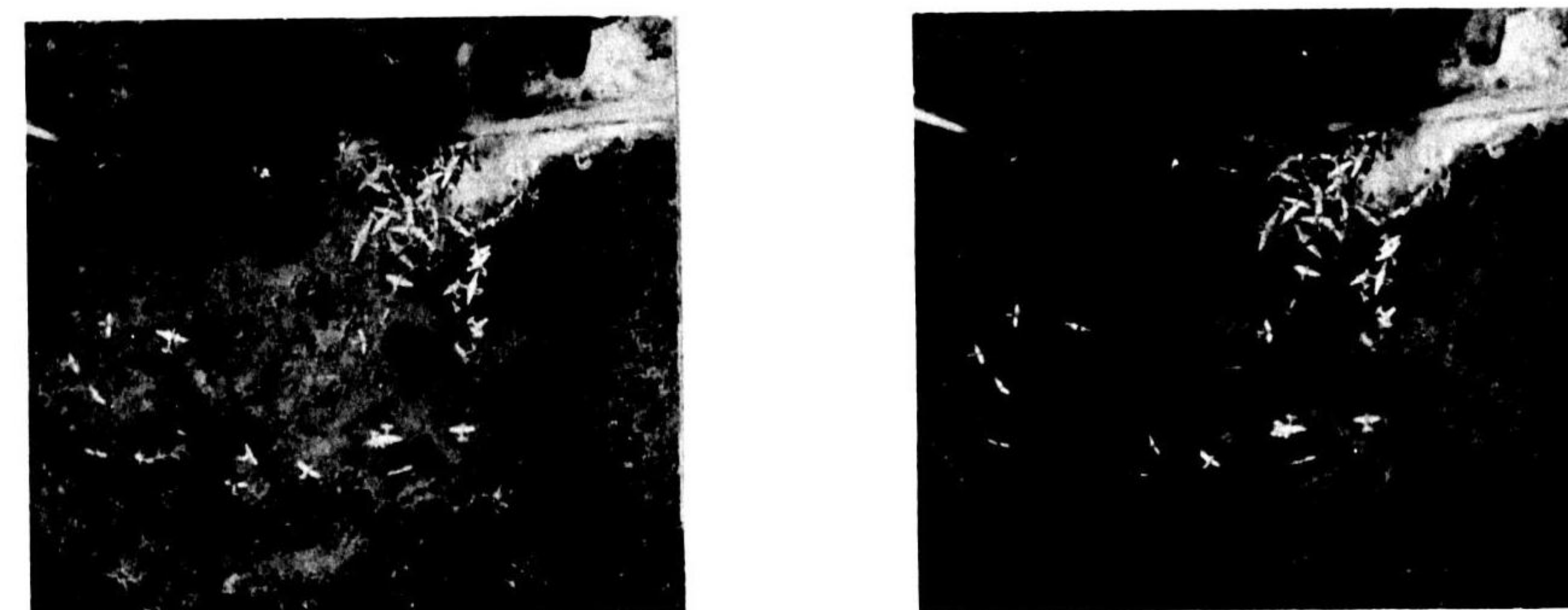


Photo Scale 1:7110

Identification Data

- Low-wing monoplane.
- Broad wing has even, sharp taper and rounded tips.
- Wing set well back on fuselage.
- Solid fuselage nose protrudes forward of engine nacelles.
- Fat triangular tailplane.
- Cabin set forward of leading edge of wing.
- Seven small windows in side of fuselage.

TOPSY is the transport version of SALLY and, as such, is hard to differentiate from SALLY save from large scale or oblique photos. TOPSY is low-wing while SALLY is mid-wing. This difference shows up well in photo above with SALLY and TOPSY side by side. Also examine the fuselage for reflections from the turret or greenhouse on SALLY. TOPSY has only the cabin windows forward of the wing visible. TOPSY has a solid nose, SALLY a transparent nose. TOPSY has a slightly broader fuselage than SALLY.

TOPSY



Photo Scale 1:8870

A TOPSY and two SALLY's are lined up above. Note the low-wing construction of TOPSY as contrasted to SALLY. TOPSY's fuselage is slightly broader and does not show reflections from the rear greenhouse as do the two SALLY's.

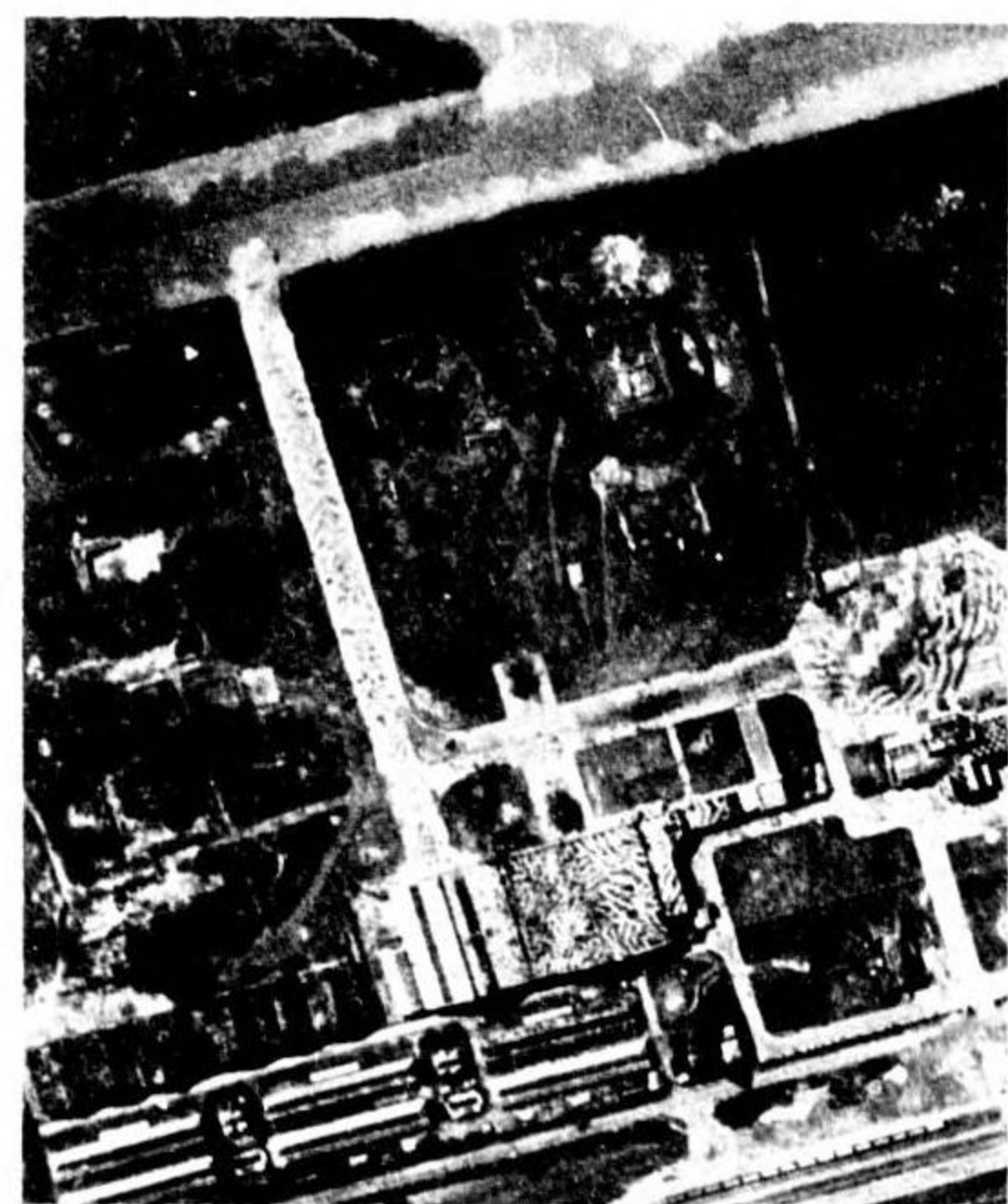
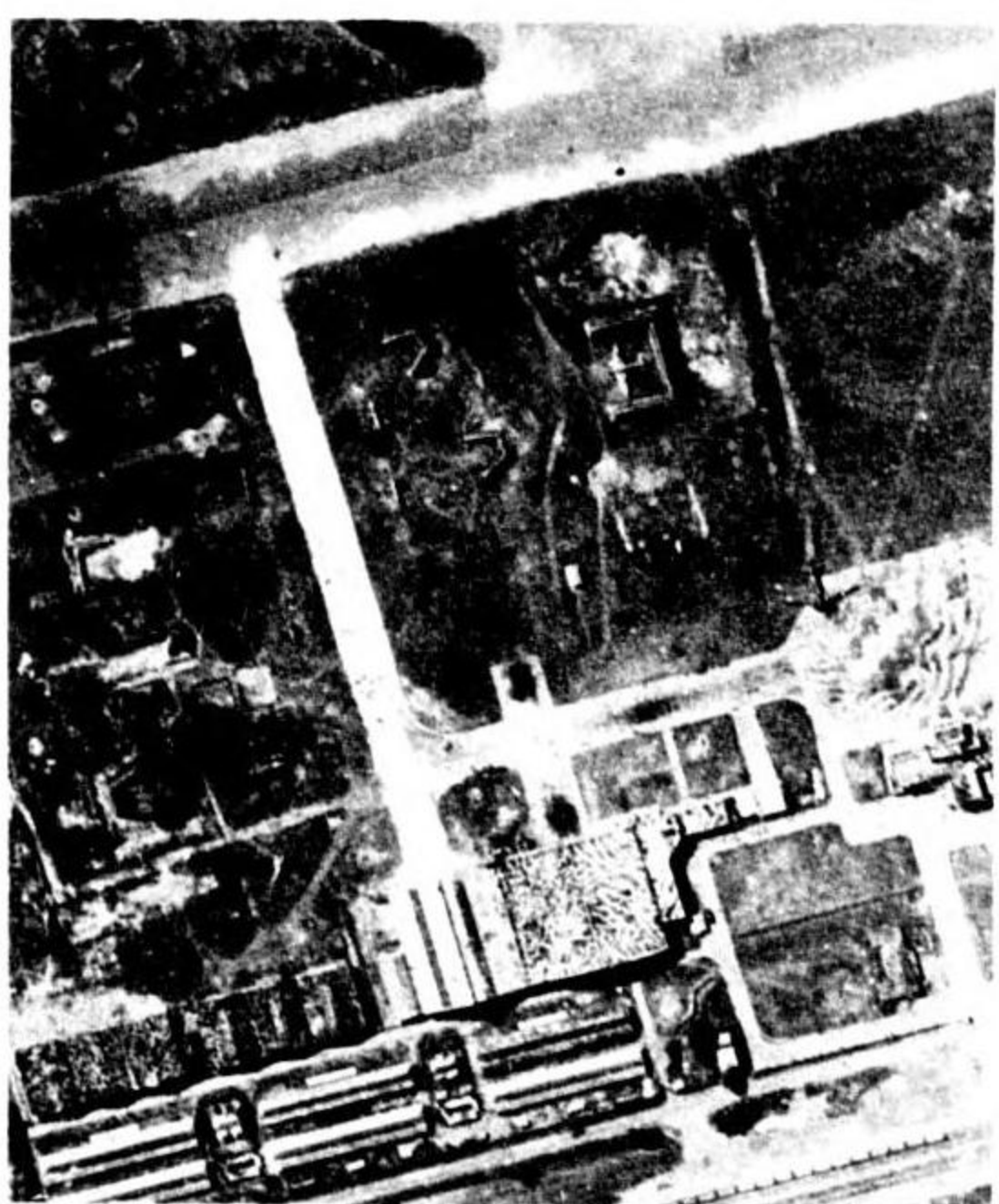
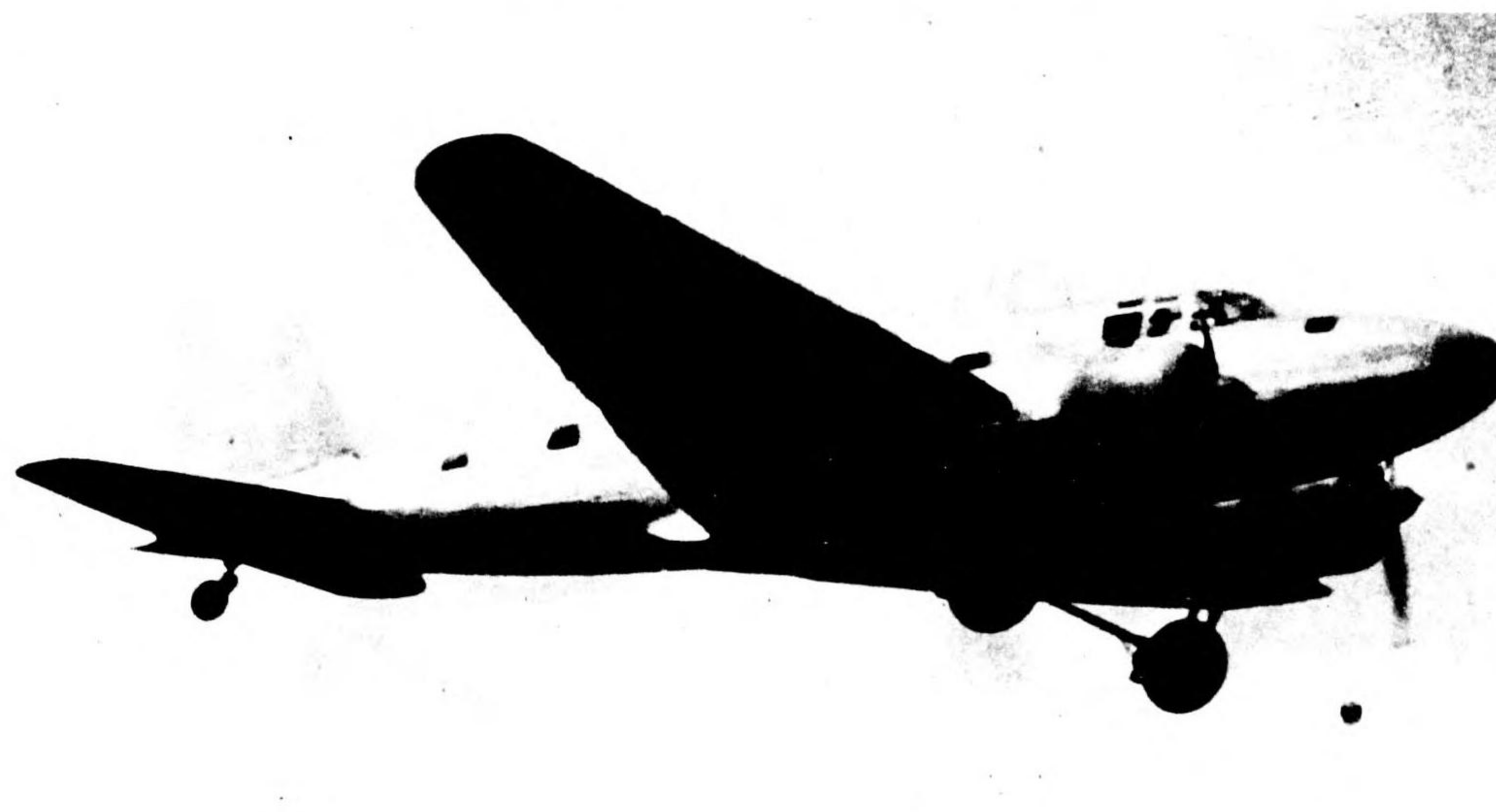


Photo Scale 1:8400

One TOPSY, one TABBY and six training biplanes at Bangkok. TOPSY reportedly carries 11 passengers or 2360 lbs. of freight.



Photo Scale 1:6935



- MITSUBISHI
- MEDIUM BOMBER
- S - 73' 10"
- L - 61' 4"

"PEGGY"

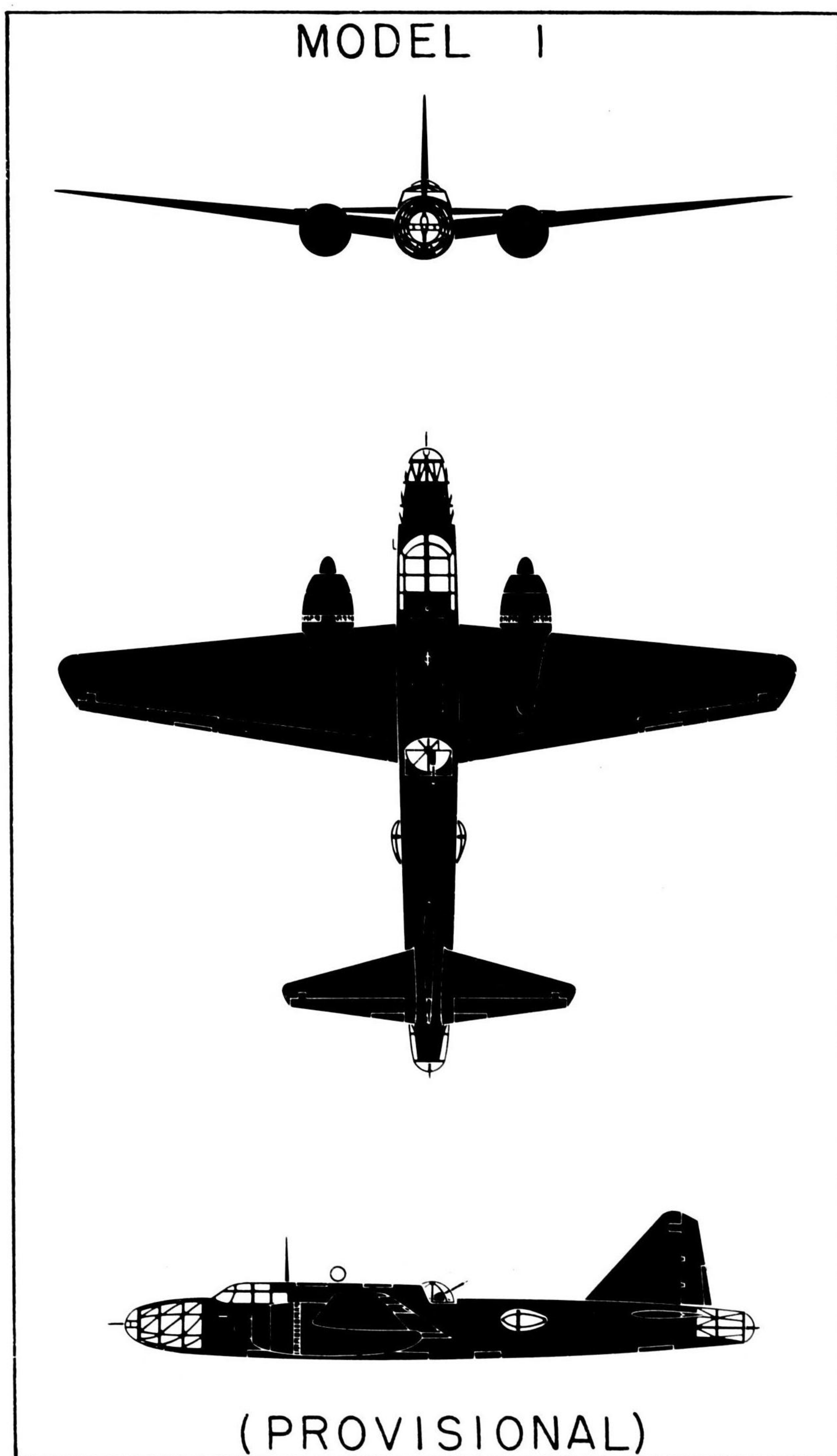


Photo Scale



1:4810

Identification Data

- Fuselage nose and engine nacelles project well forward of wing.
- Wing has straight, even taper and blunt tips.
- Long, fat fuselage.
- Ball turret at trailing edge of wing.
- Slim tailplane of wide span has moderate taper on leading edge, slight taper on trailing edge.
- Vertical fin is set forward of horizontal stabilizer.
- Large tail turret projects aft of tailplane.

PEGGY may also be used as a torpedo bomber. It reportedly will replace SALLY but recognitionally resembles HELEN and BETTY.

"HELEN"

- NAKAJIMA 100
- MEDIUM BOMBER
- S-66' 7"
- L-53'

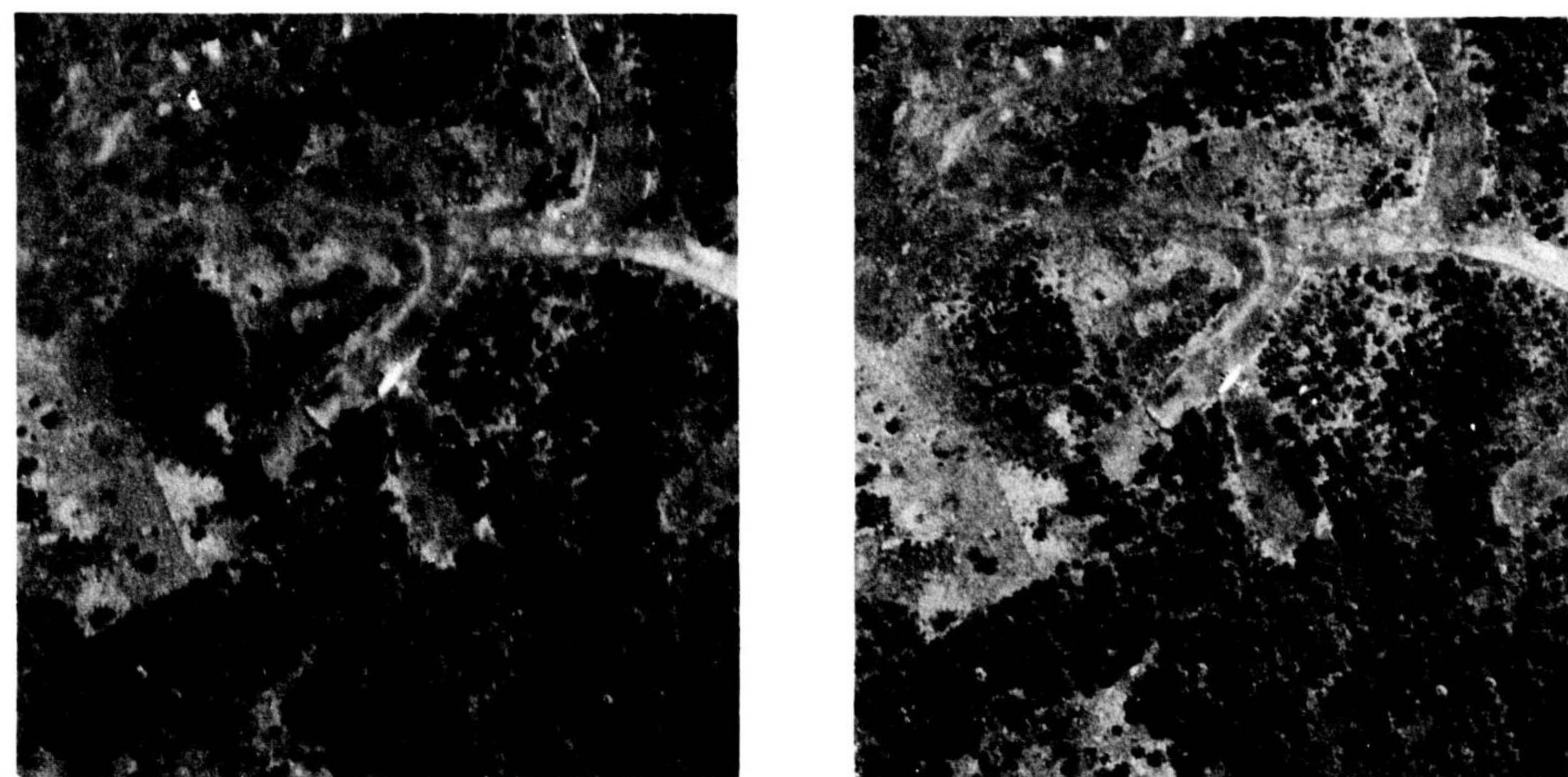
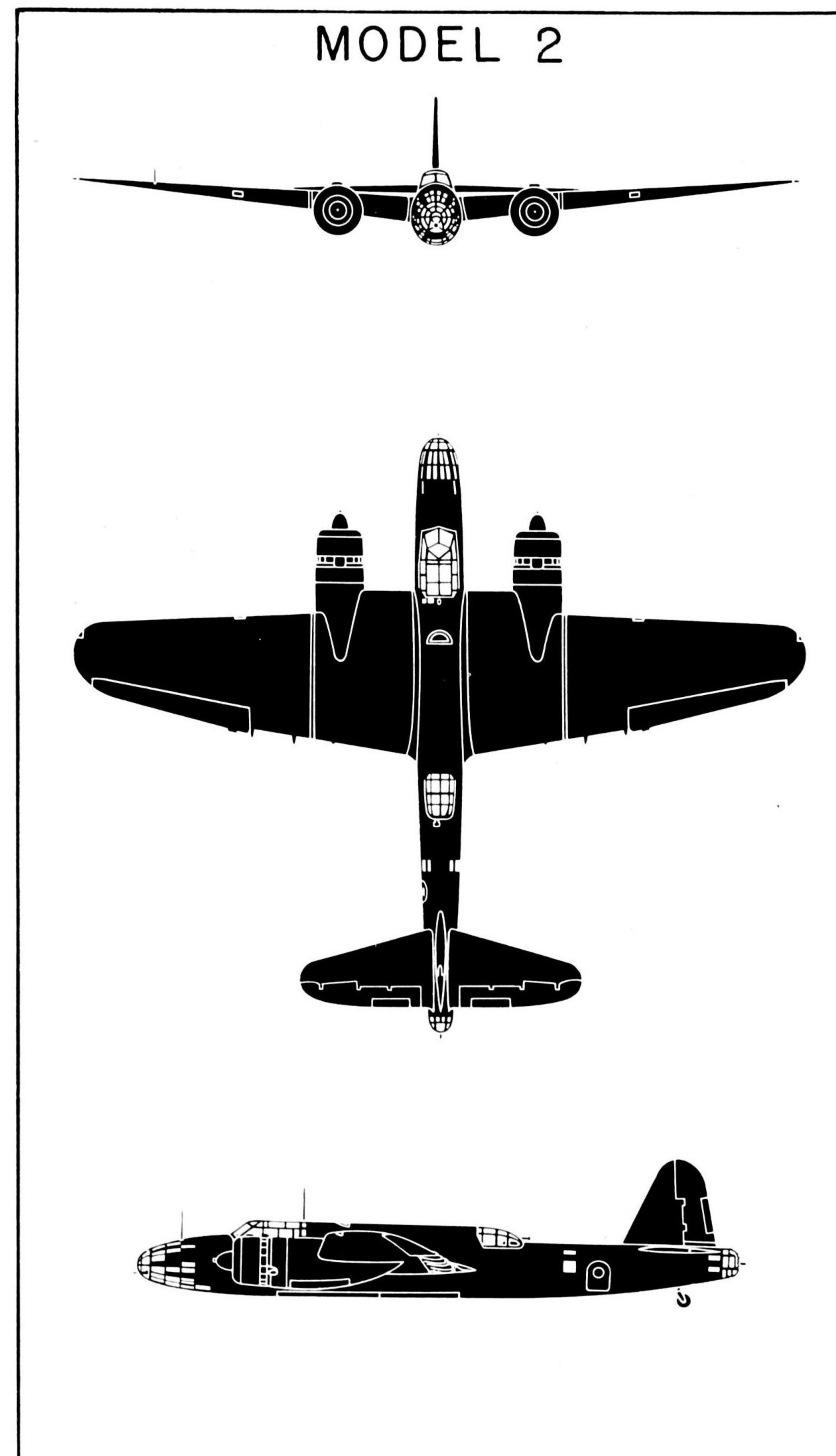


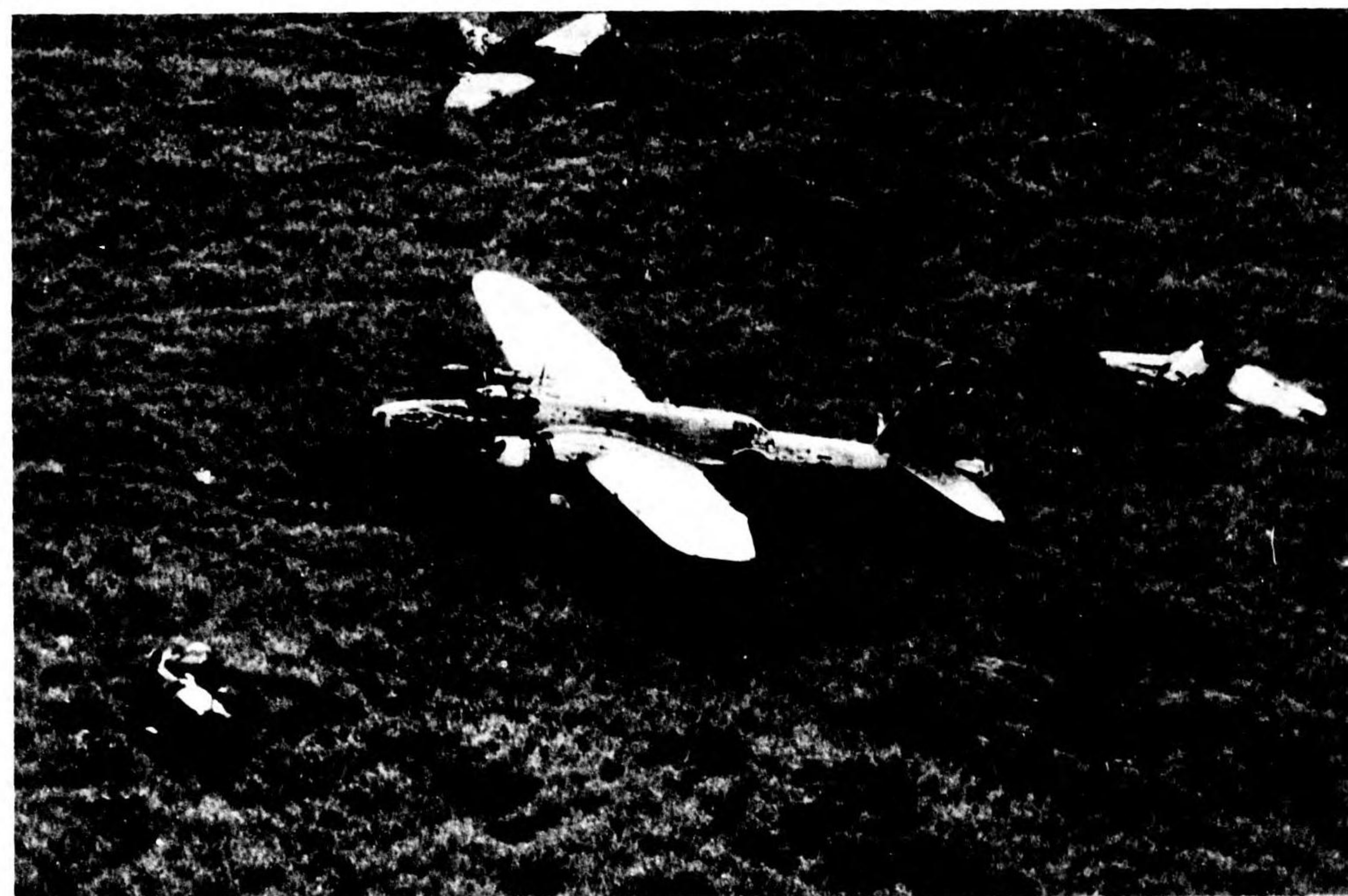
Photo Scale 1:7600

Identification Data

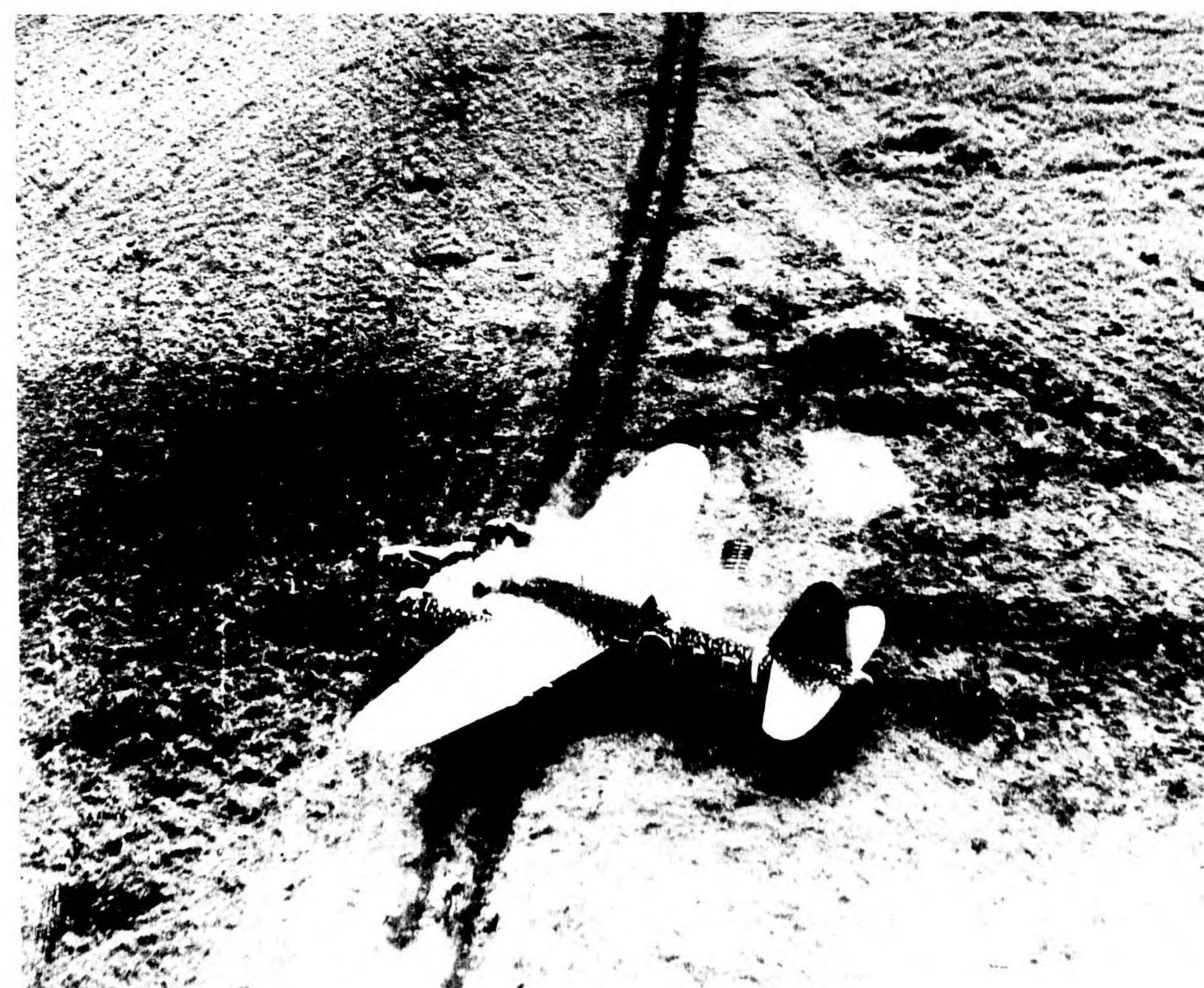
- Trailing edge of wing is elliptical.
- Leading edge of wing is straight with center section between engine nacelles set forward.
- Fuselage nose and engine nacelles project forward to give a "nosey" appearance.
- Semi-circular tailplane.
- Small, projecting tailgun.



HELEN



In side view the raised canopy section above the wing and the tall fin and rudder are distinctive. Note the tail turret and the slide rails for the Fowler-type flaps. HELEN is one of the heaviest armed and armored bombers the Japanese possess.



RESTRICTED

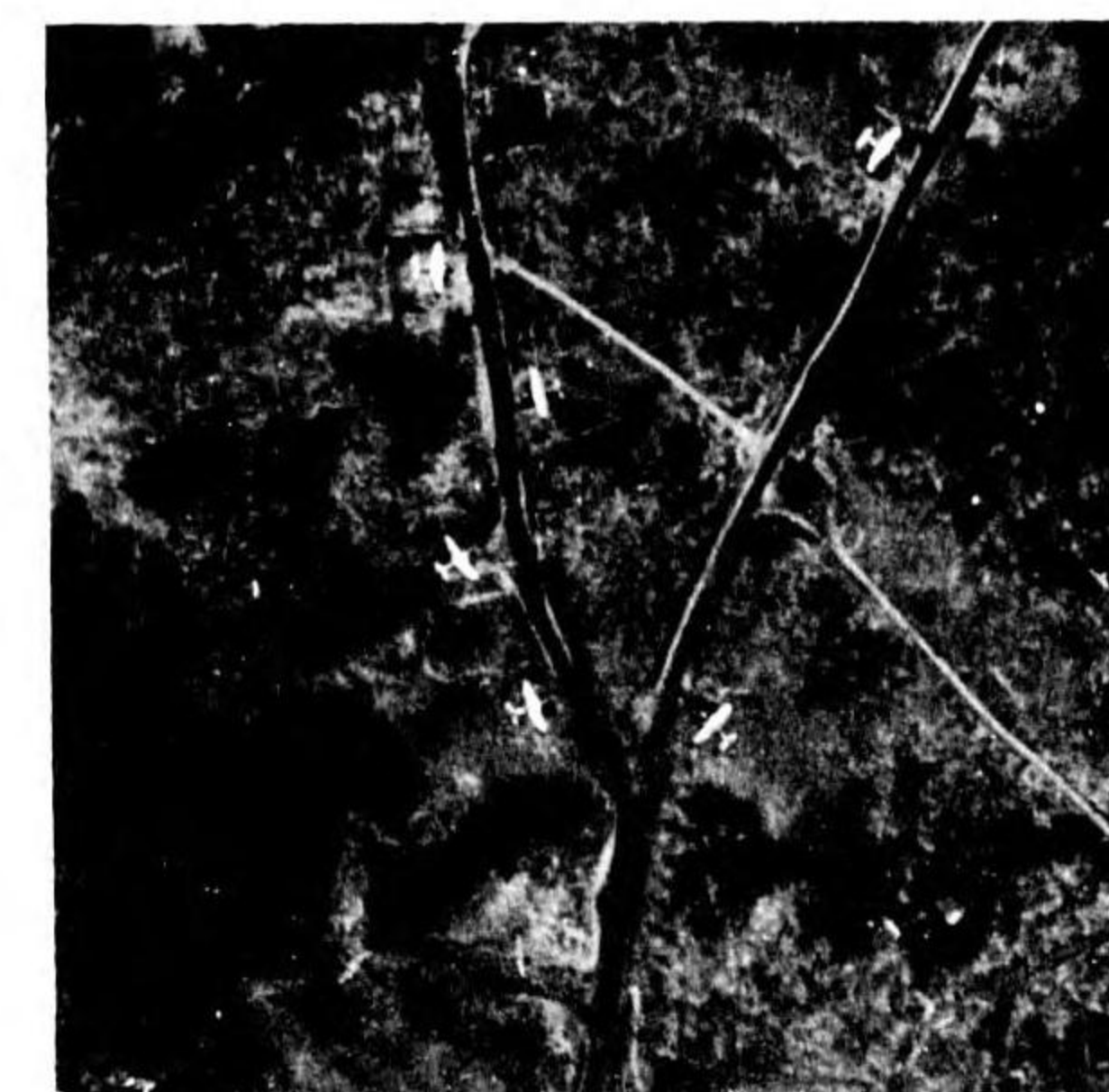


Photo Scale 1:7745

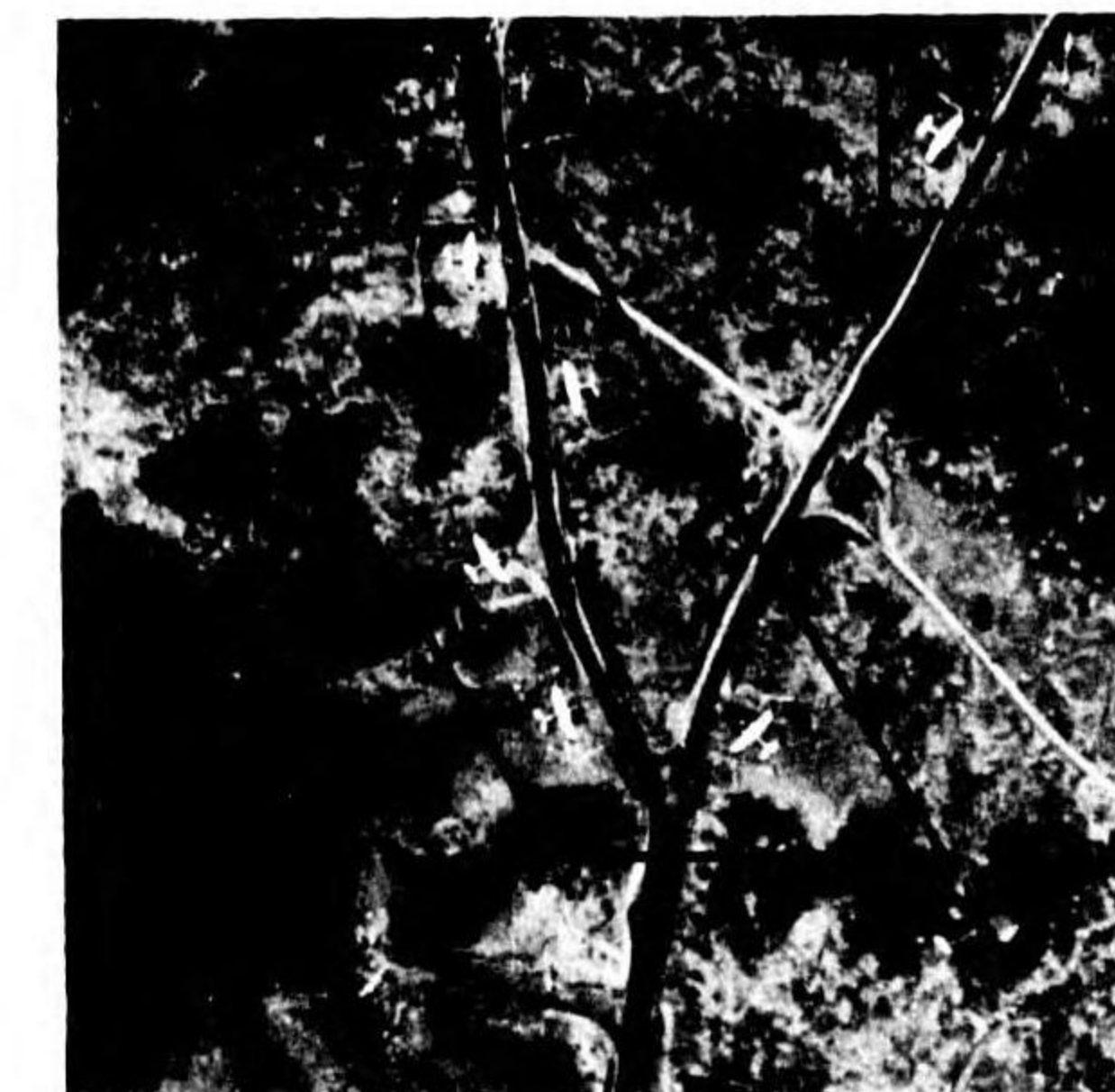


Photo Scale 1:4075



HELEN has often been confused with SALLY in the past. Note, however, that HELEN has a straight leading edge to the wing while SALLY has a sharp taper. HELEN's fuselage nose and engine nacelles project much further forward of the wing than do the nose and nacelles on SALLY.



Photo Scale 1:8870



HELEN at Bangkok minus its engine nacelles.

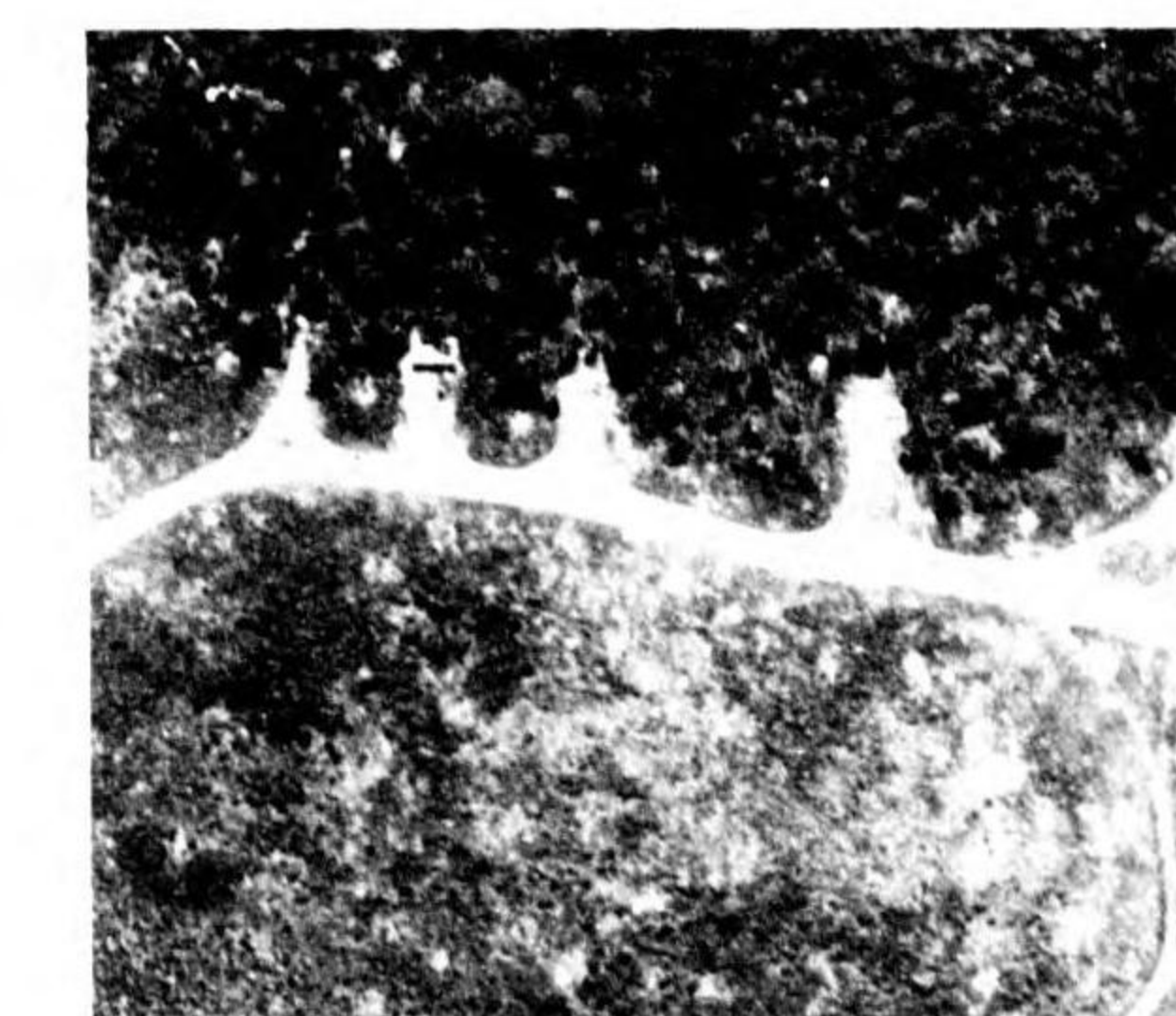
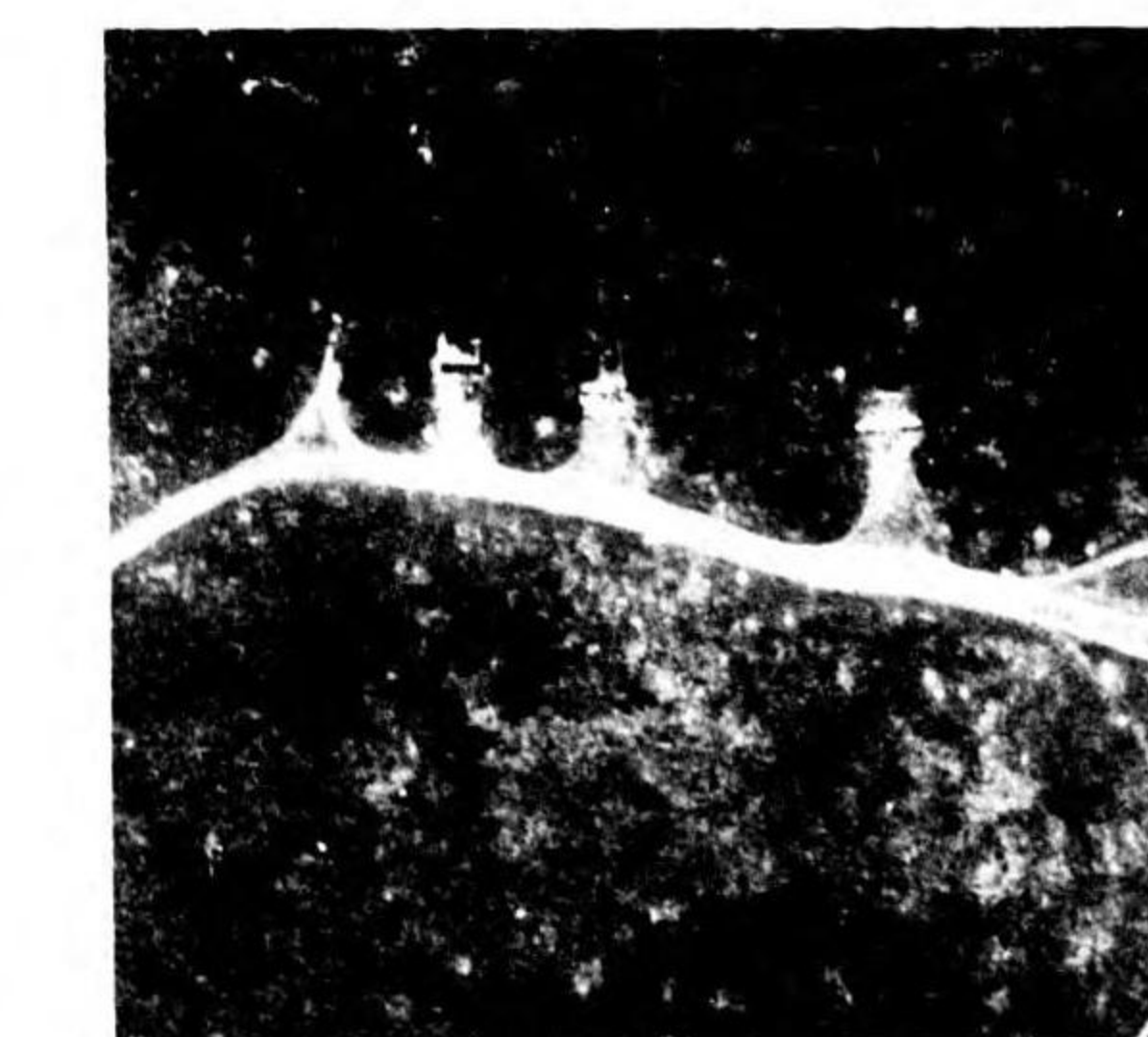


Photo Scale 1:7260



"FRANCES"

- NAKAJIMA
- TORPEDO BOMBER - FIGHTER
- S - 65' 7"
- L - 49' 2"

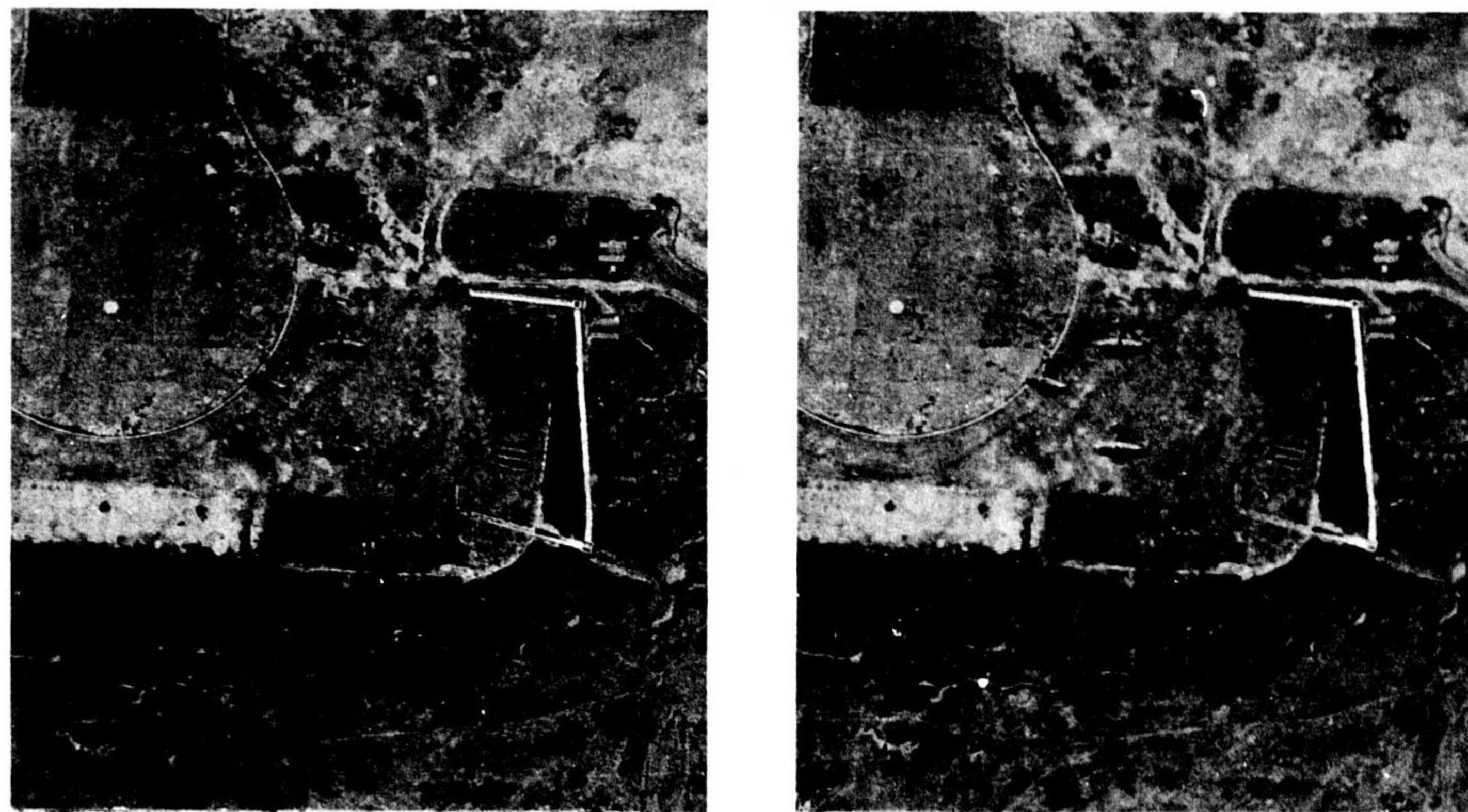
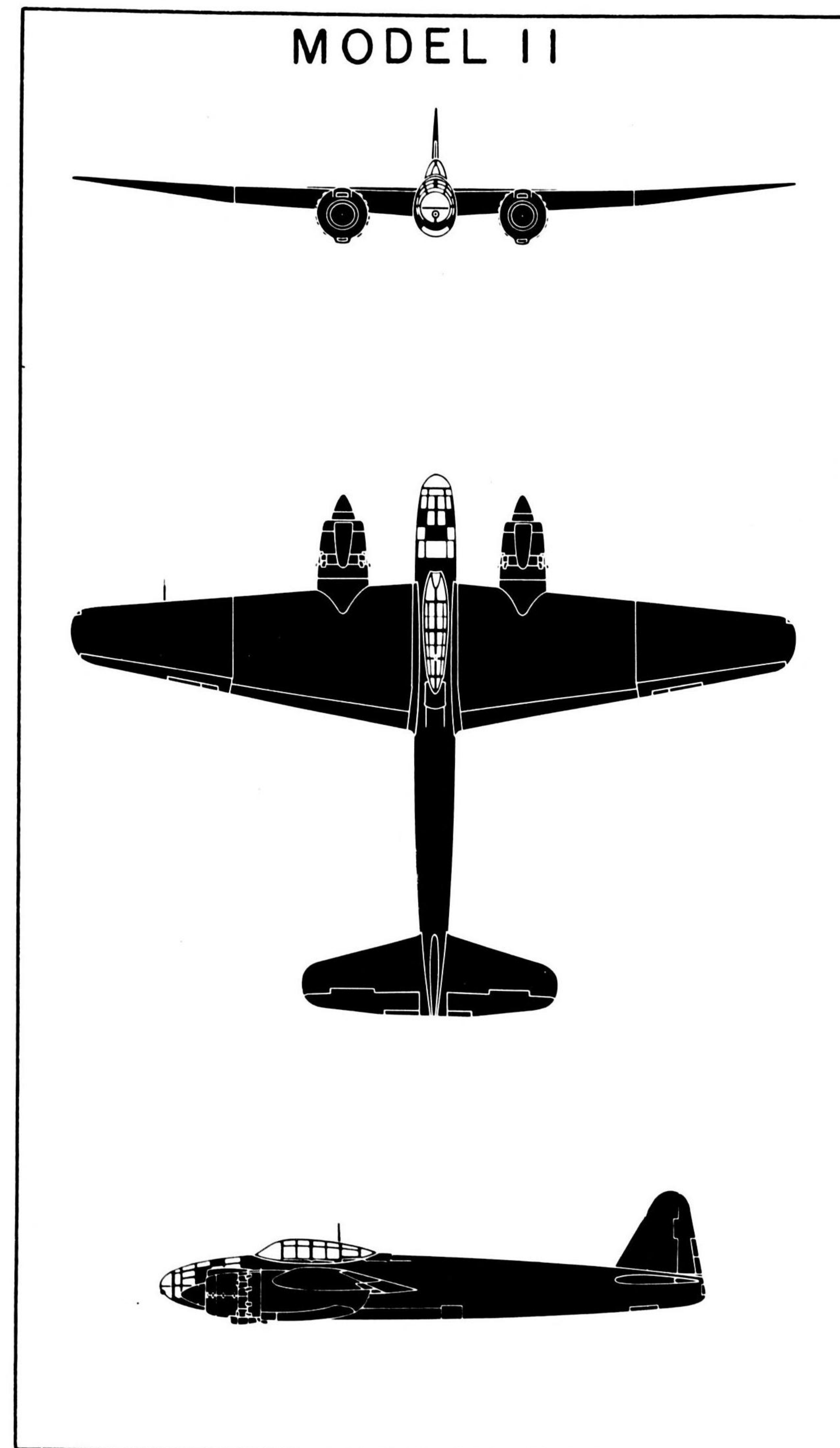


Photo Scale 1:5220

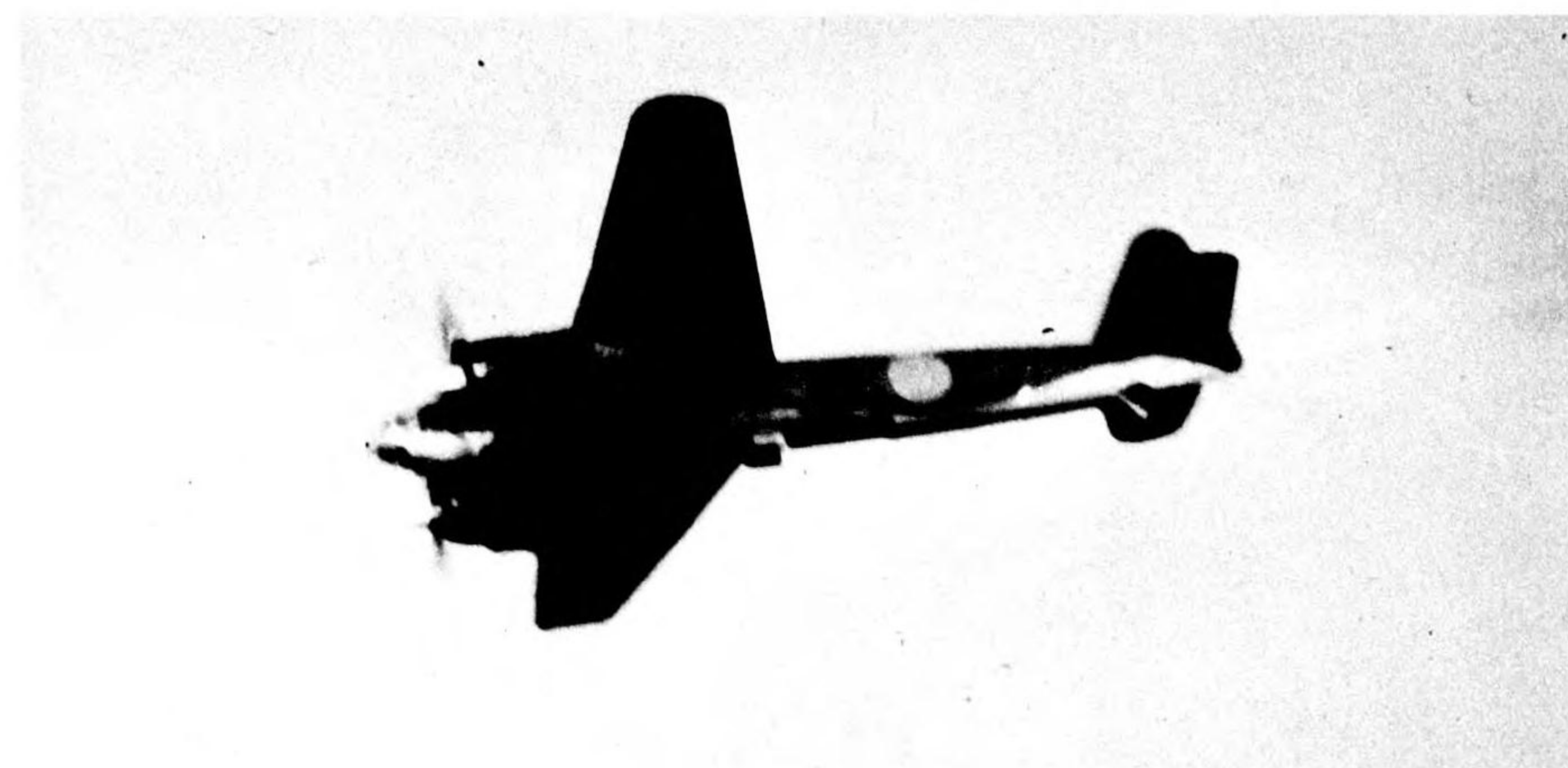
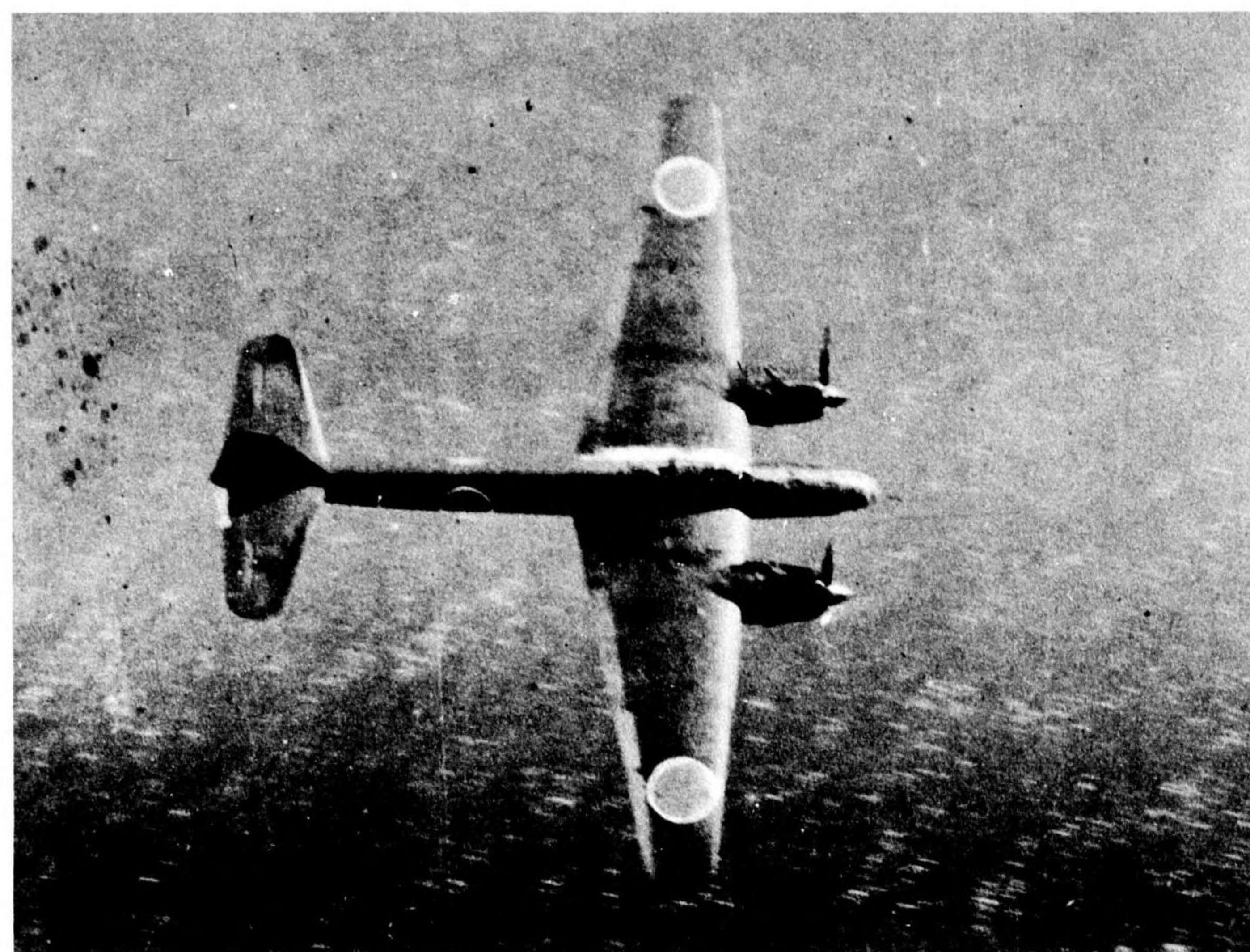
Identification Data

- High mid-wing monoplane.
- Fuselage nose projects slightly forward of underslung engine nacelles.
- Leading edge of wing has slight taper, trailing edge moderate taper.
- Slim fuselage.
- Tapered tailplane has wide span.
- Small greenhouse.

FRANCES is a multi-purpose plane like JUDY and IRVING. Primarily an anti-shipping plane used for torpedo bombing, dive bombing and horizontal bombing it has also been converted for use as a night fighter.



FRANCES



FRANCES is the largest of a group of five planes which have similar outlines. The other four planes are IRVING, LILY, NICK and DINAH. Of this group LILY is easiest to distinguish due to its projecting fuselage nose, stubby engine nacelles and straight leading edge of the wing. NICK and DINAH closely resemble each other and fall in a size group considerably smaller than the other three planes. To distinguish these two see pages 2.25-2.28. FRANCES is very similar to IRVING but has a ten-foot wider wing span. Note the top stereo on this page.

In contrast to similar planes FRANCES has an extremely small greenhouse which does not even extend the length of the wing root chord. Compare this with the greenhouse on IRVING.

R E S T R I C T E D

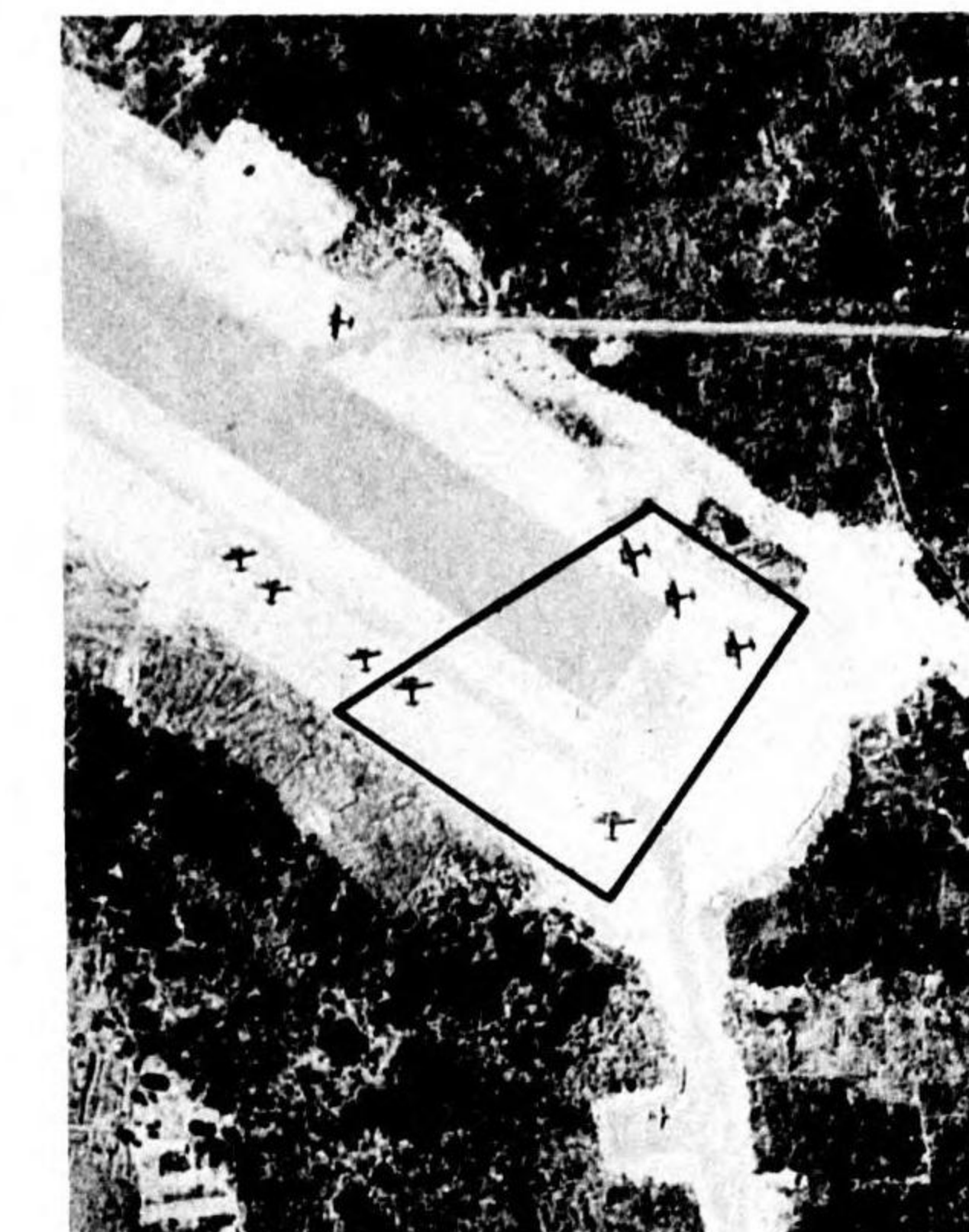


Photo Scale 1:9265

Five FRANCES' and four IRVING's at Yap. Note the similarity. FRANCES is the larger plane and has a fatter wing and larger tailplane. Note the extremely slim fuselage and pointed nose on IRVING.



Photo Scale 1:3280

FRANCES is the only Navy twin-engine plane having a relatively high-wing construction. The common Army types as well as the Navy types are of low-wing or mid-wing construction.

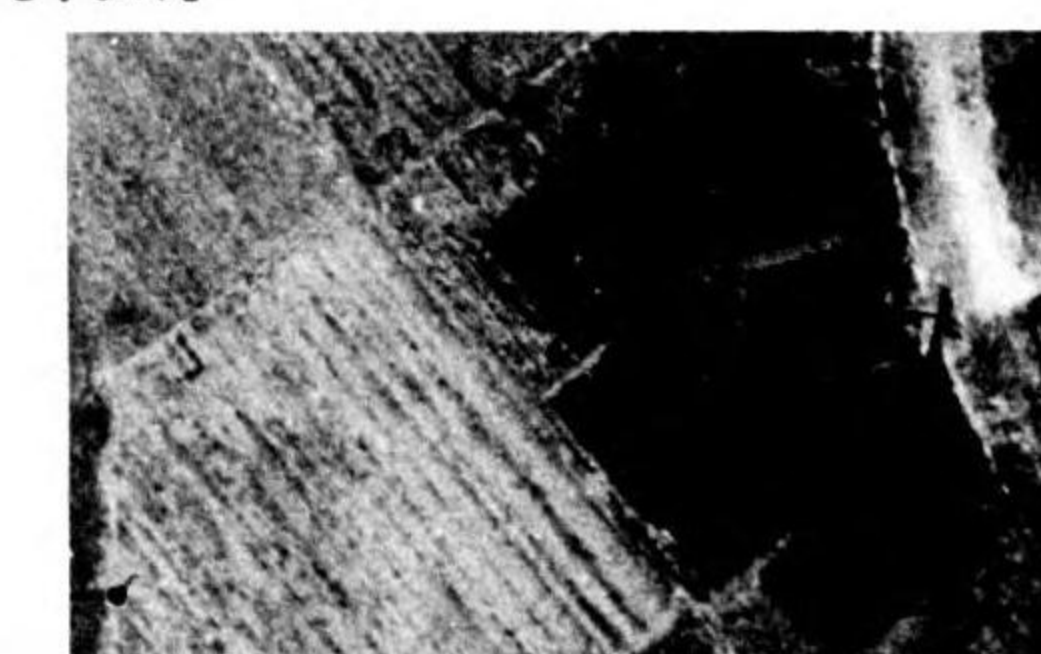


Photo Scale 1:4980

"LILY"

- KAWASAKI 99
- LIGHT BOMBER
- S-57' 4"
- L-42' 1/2"



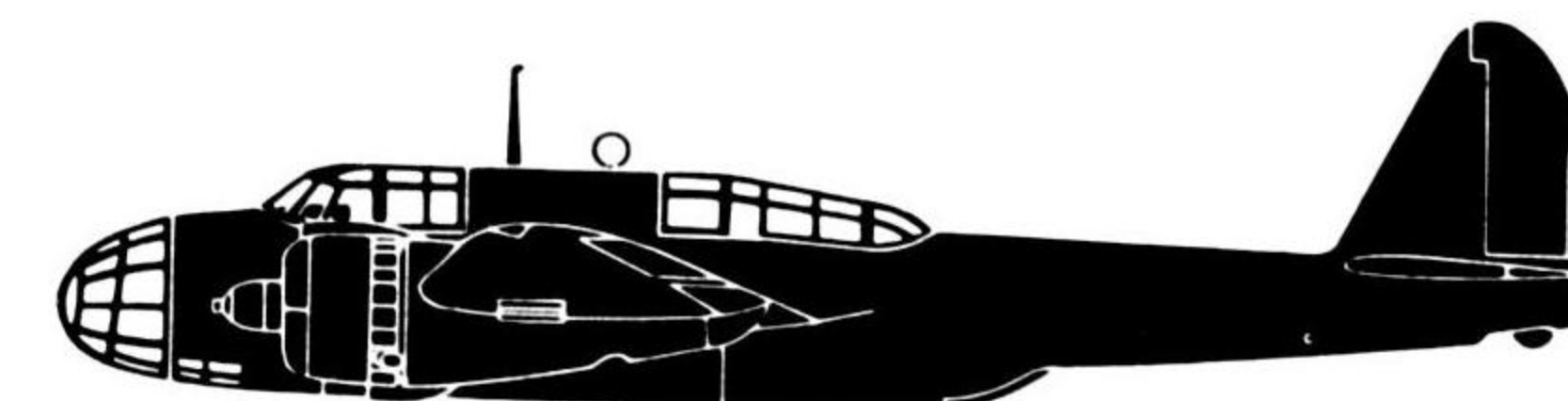
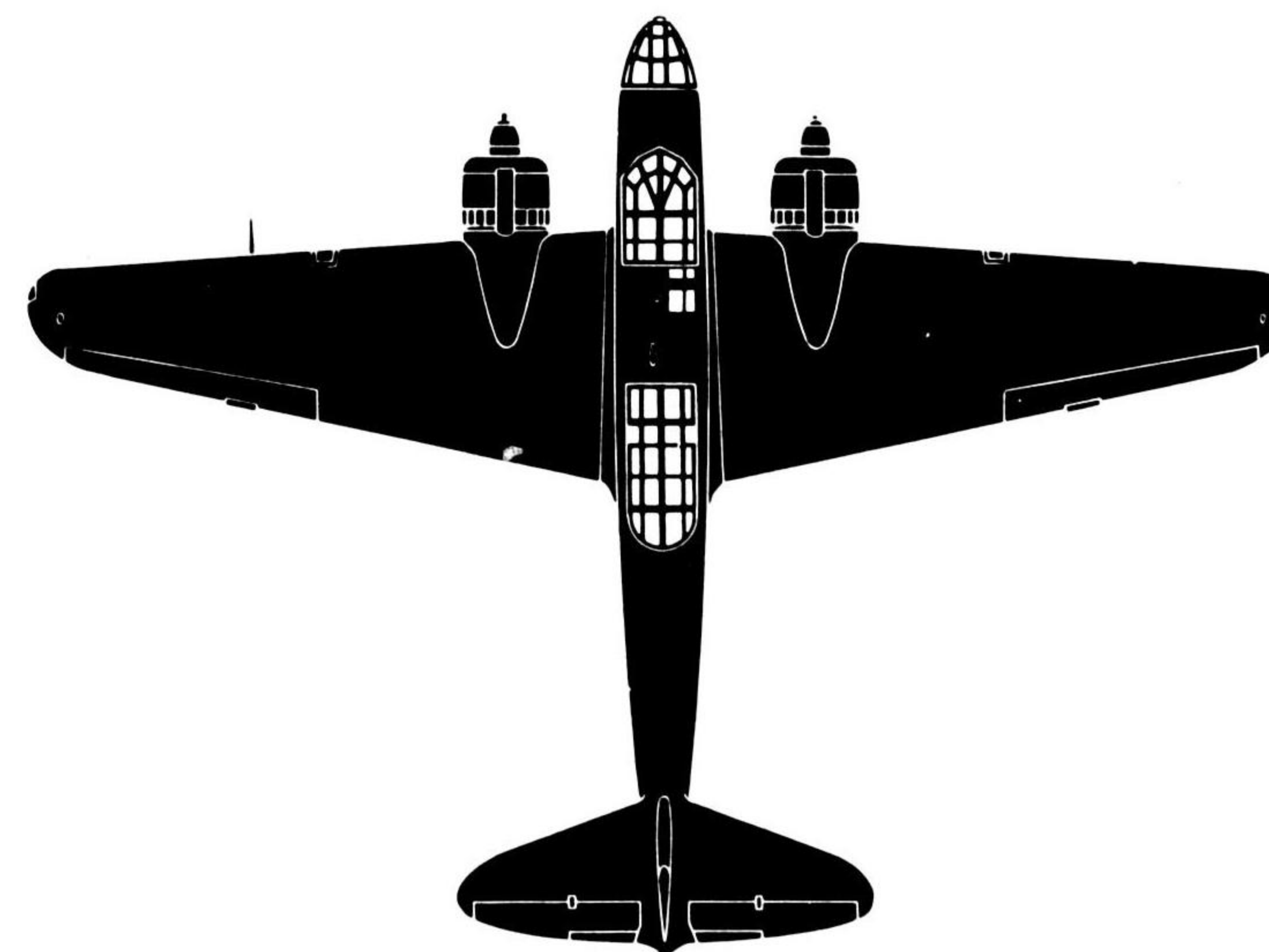
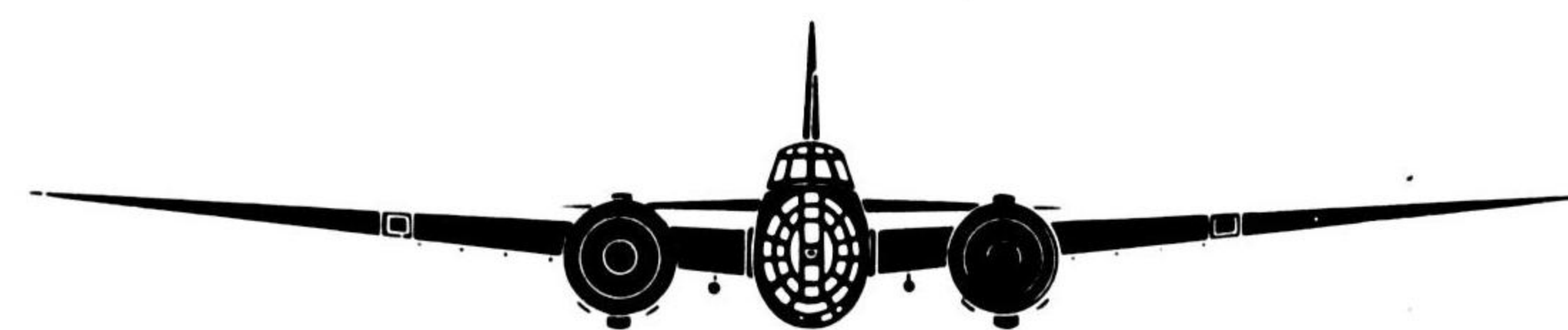
Photo Scale 1:5060

Identification Data

- Nearly straight leading edge to wing, trailing edge has straight taper.
- Transparent fuselage nose projects well forward of stubby engine nacelles.
- Semi-elliptical tailplane.
- Canopy and bomb bay form huge bulge in forward fuselage, narrowing abruptly in after portion of fuselage.

LILY is also used as a dive bomber and as a reconnaissance plane.

MODEL 2



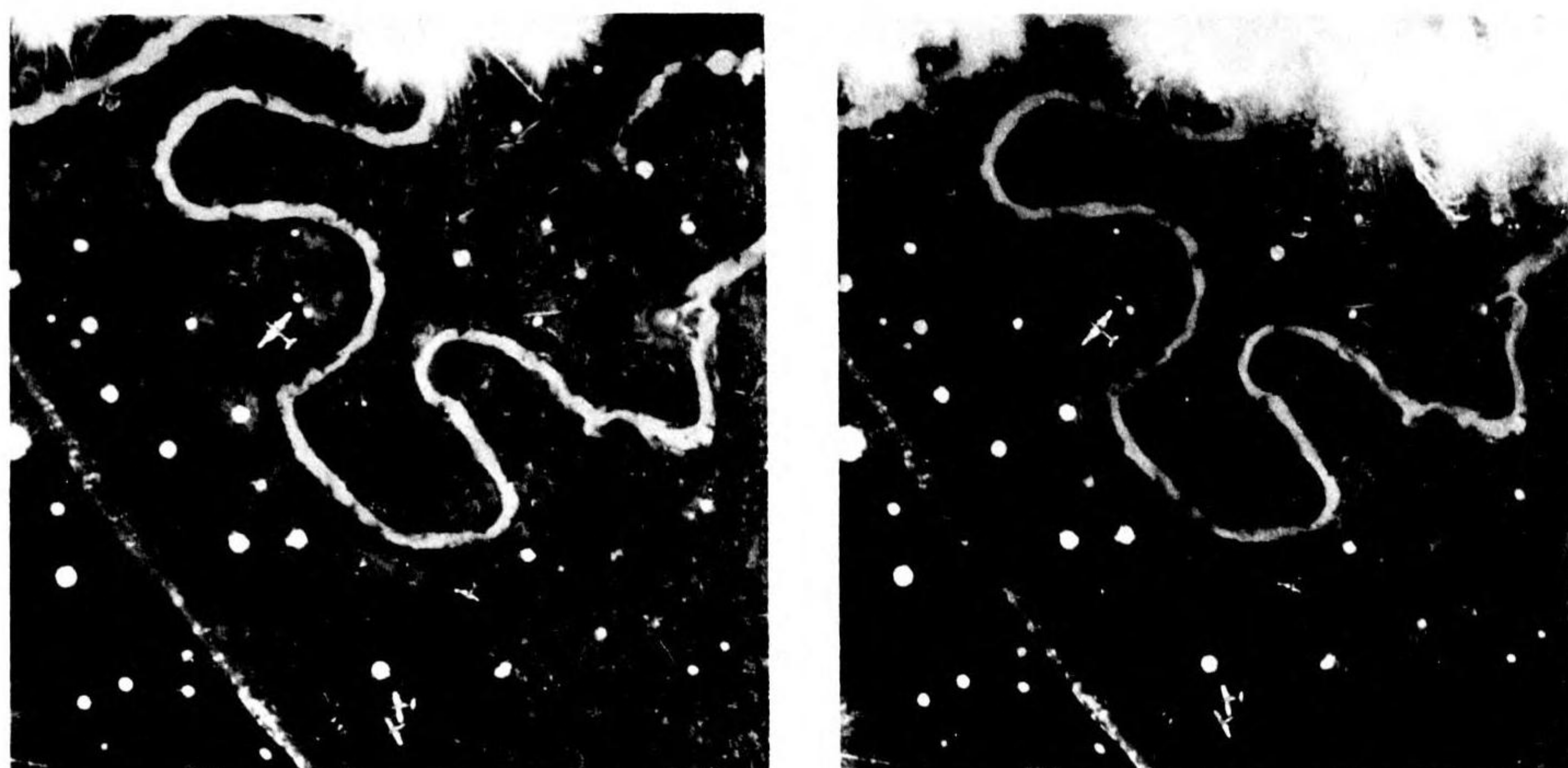


Photo Scale 1:4880

The smaller fighter planes above are OSCAR's, Model 2. Note the distinctive semi-elliptical tailplane and stubby engine nacelles of LILY.

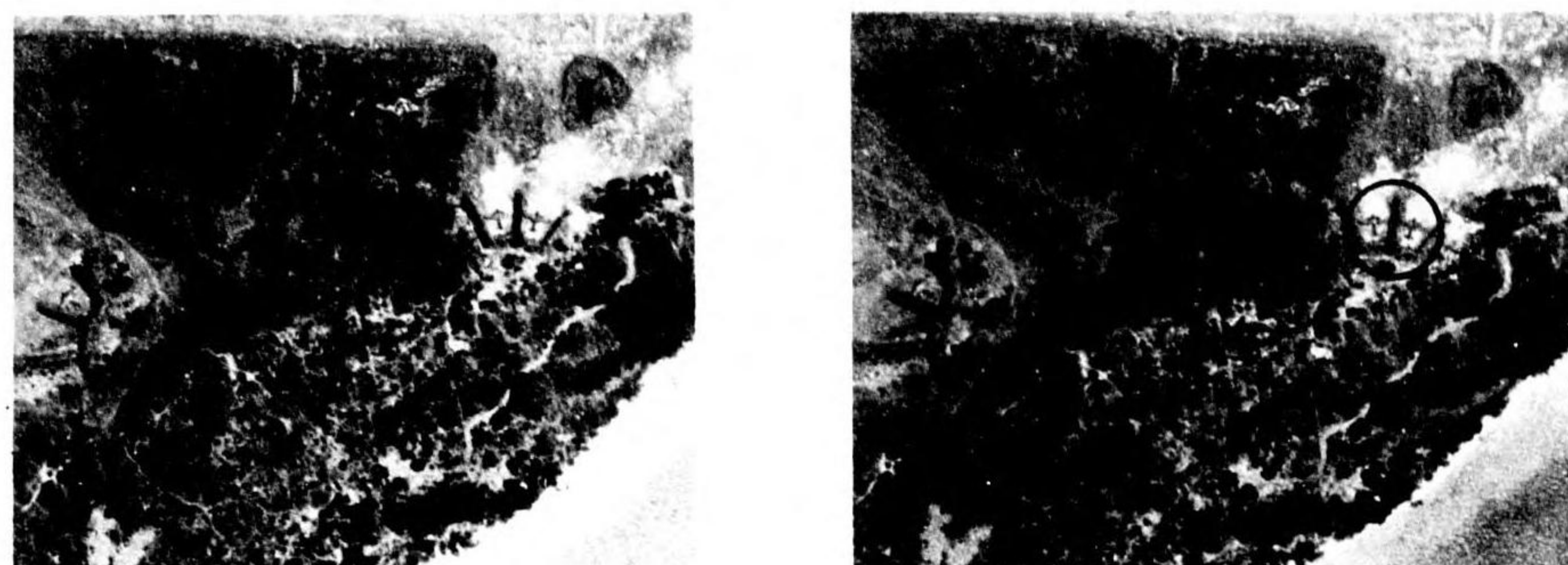


Photo Scale 1:7760

LILY is the smallest twin-engine Jap plane in which the fuselage nose projects noticeably forward of the engine nacelles.

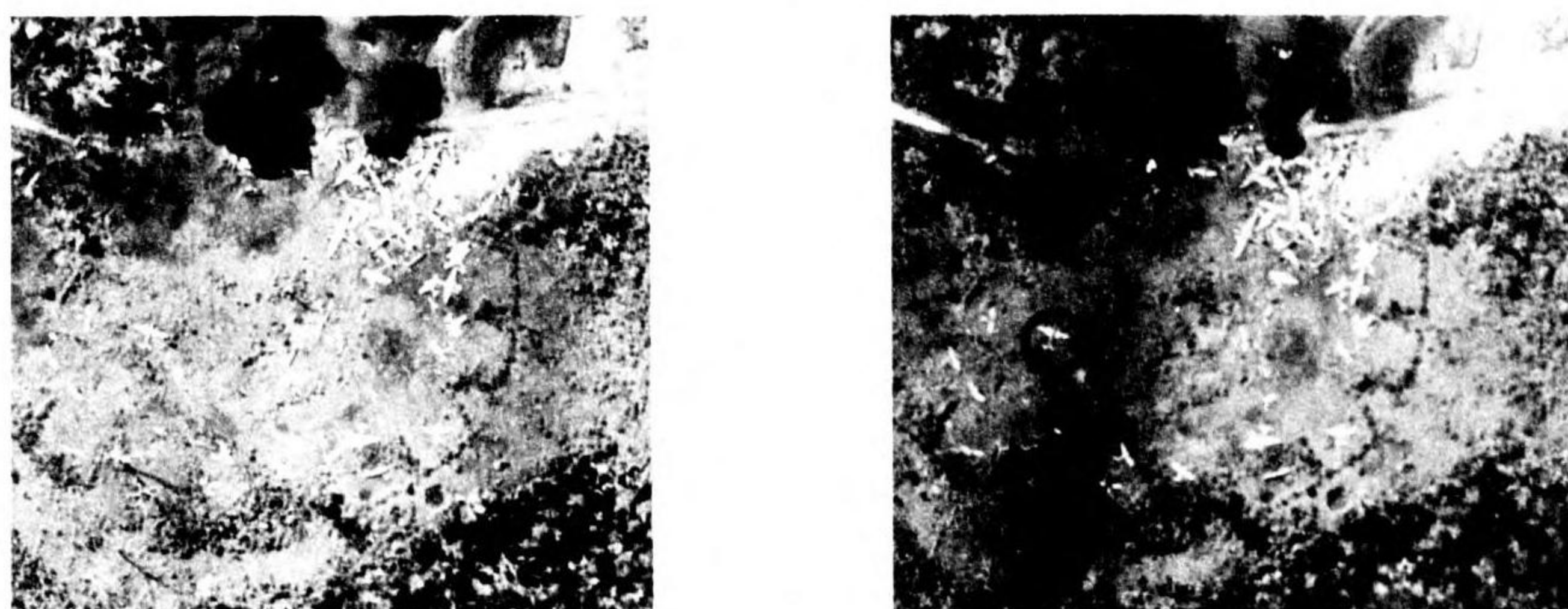


Photo Scale 1:6965

The leading edge of the wing on LILY usually appears straight. This feature plus the small tailplane with its elliptical leading edge distinguishes LILY from SALLY.

R E S T R I C T E D

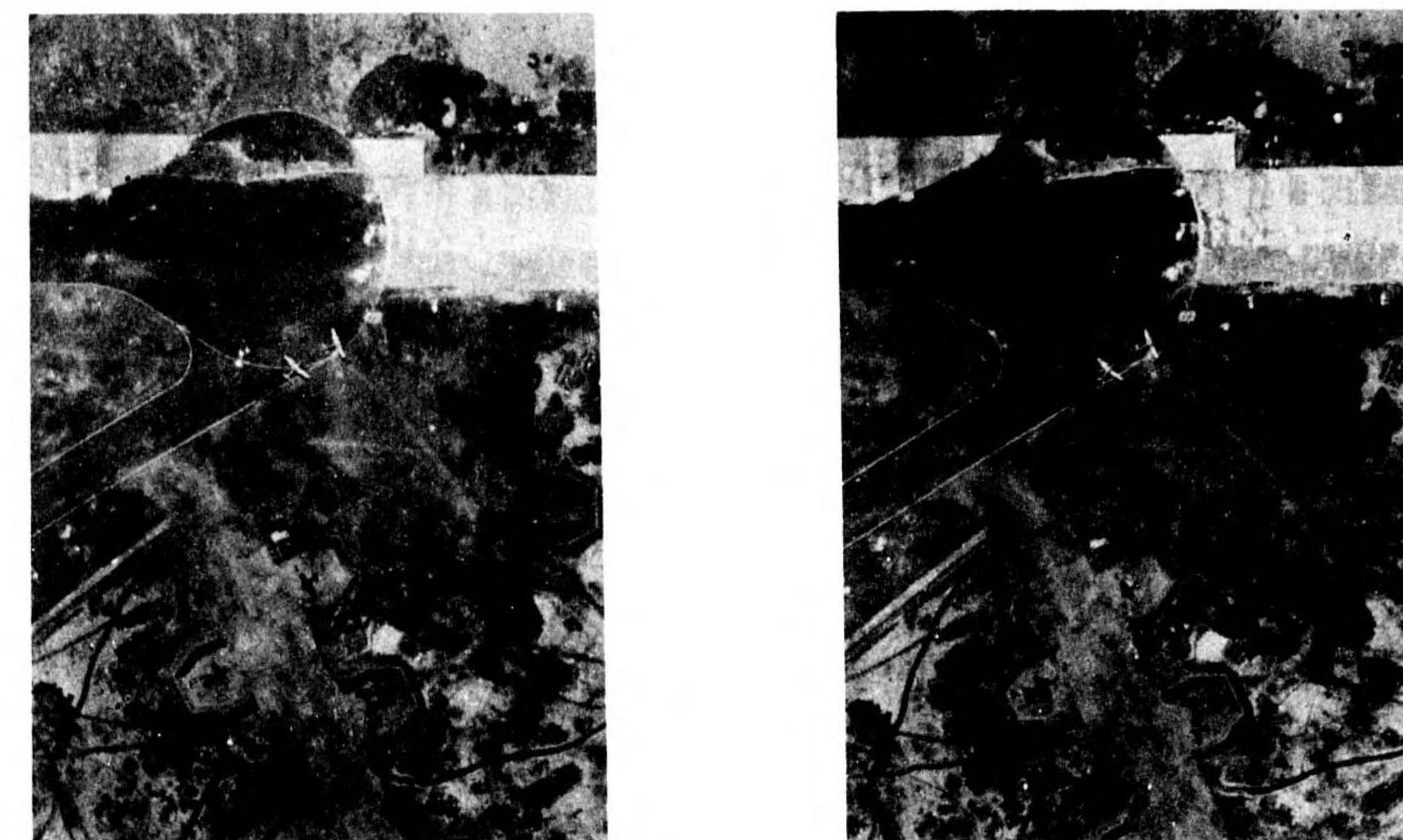


Photo Scale 1:6750

Since the fuselage nose is largely glass it may not show up well and, thus, be confused with snub-nosed types of similar size.

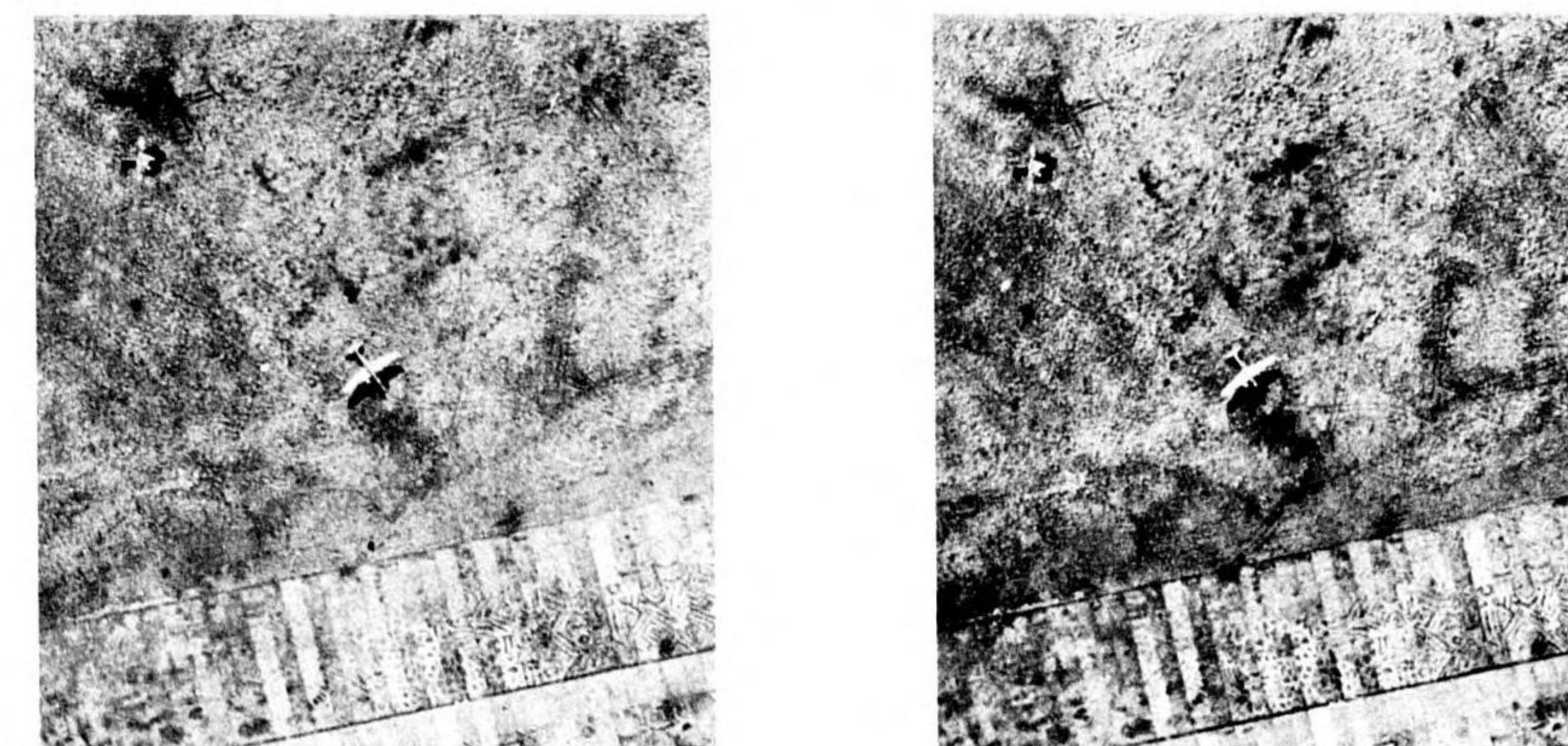


Photo Scale 1:3795

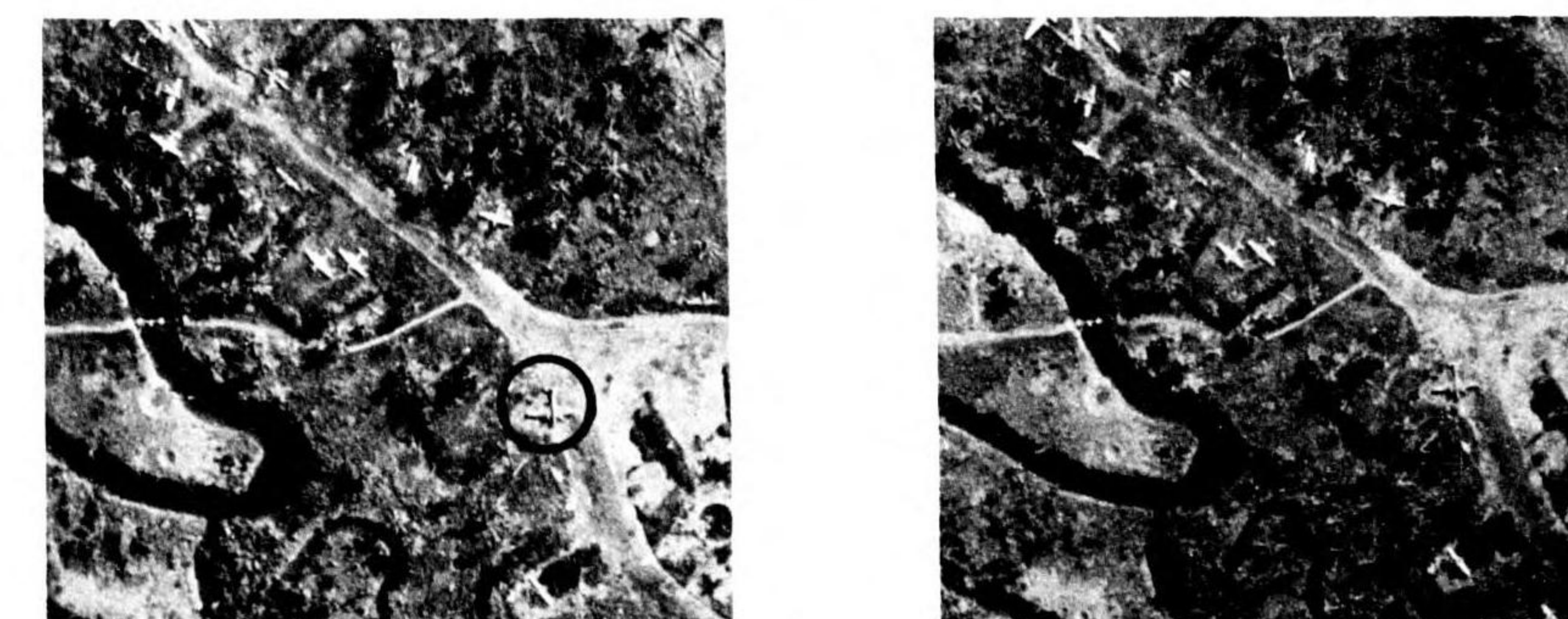
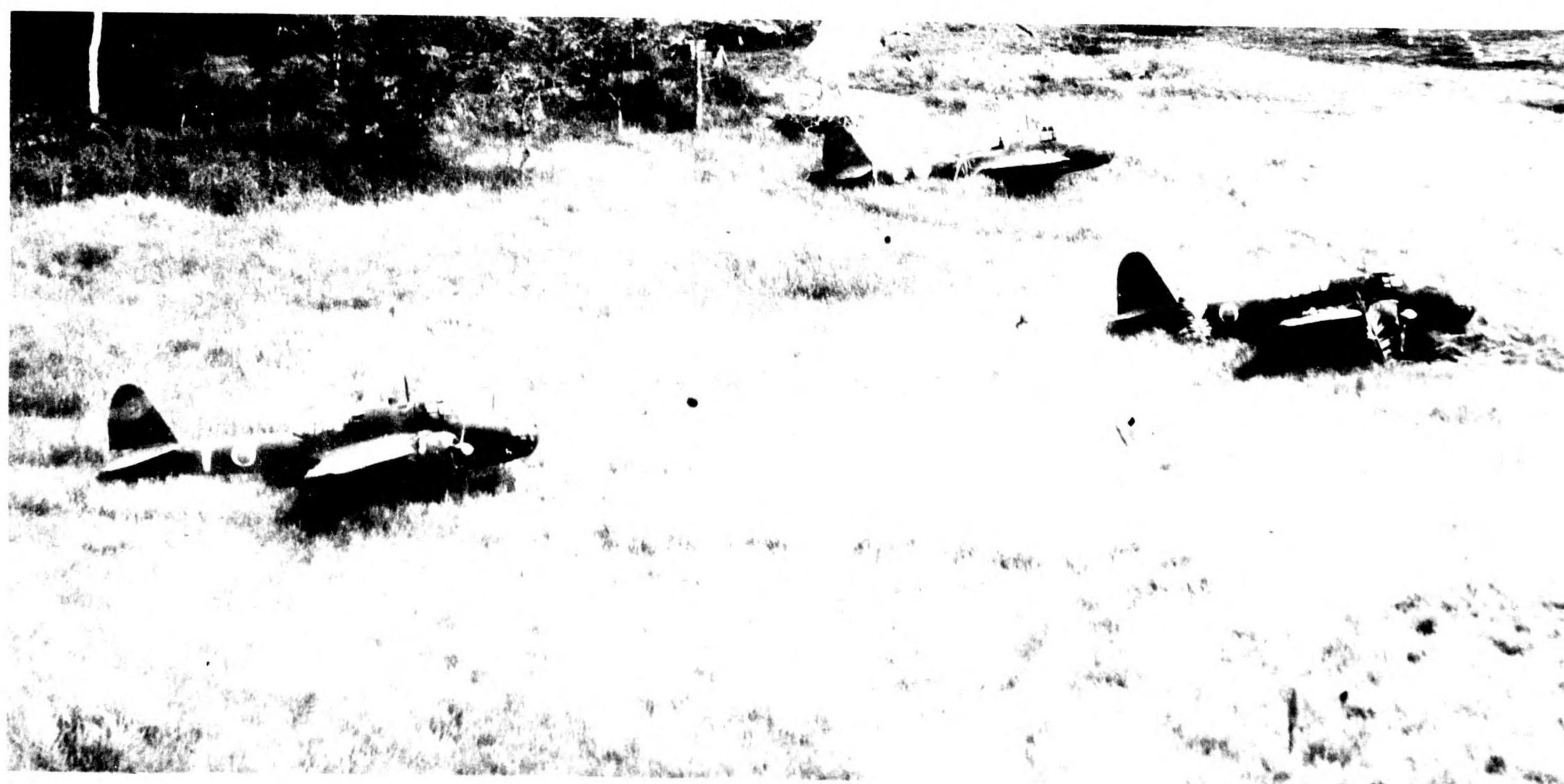
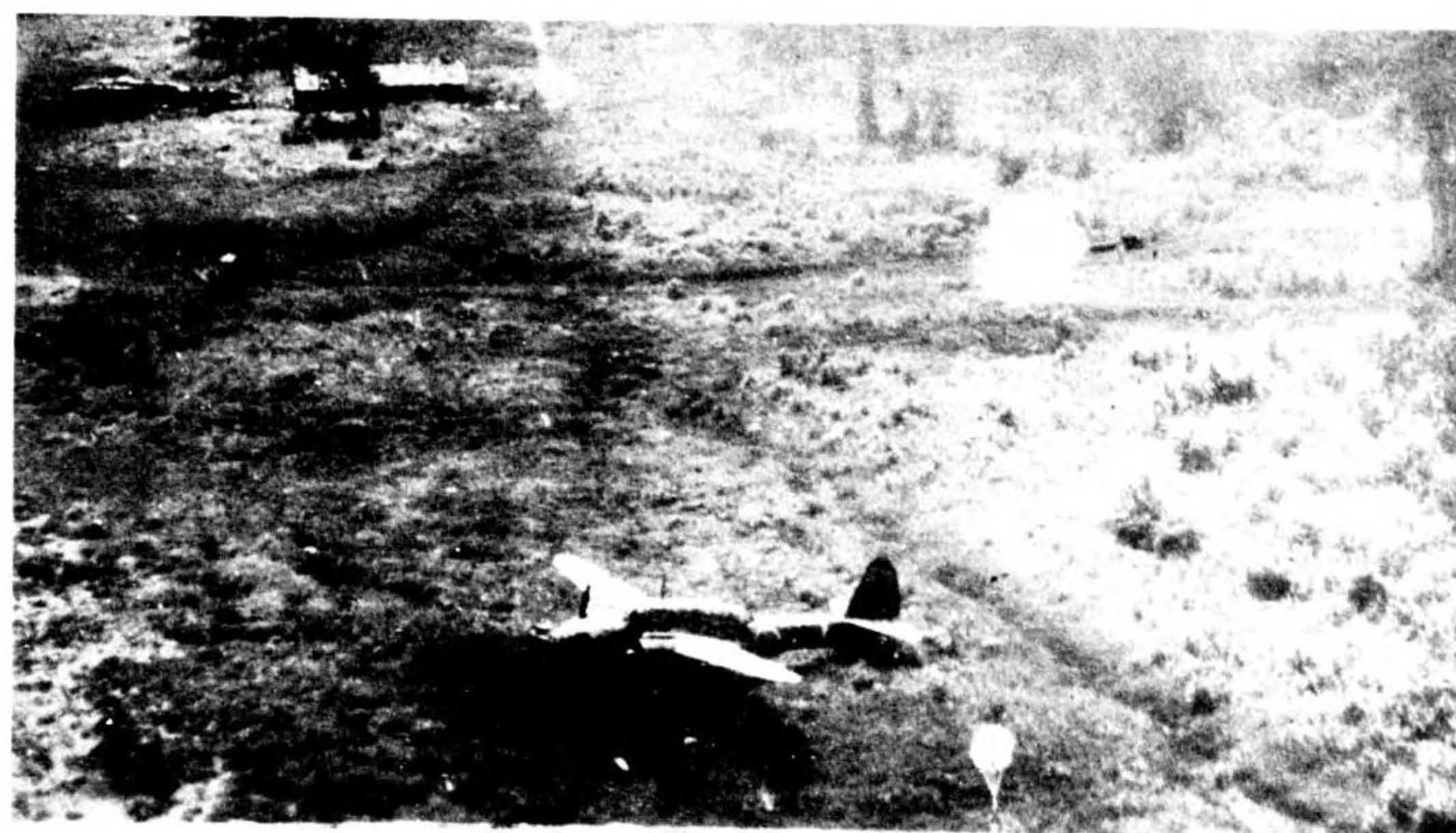
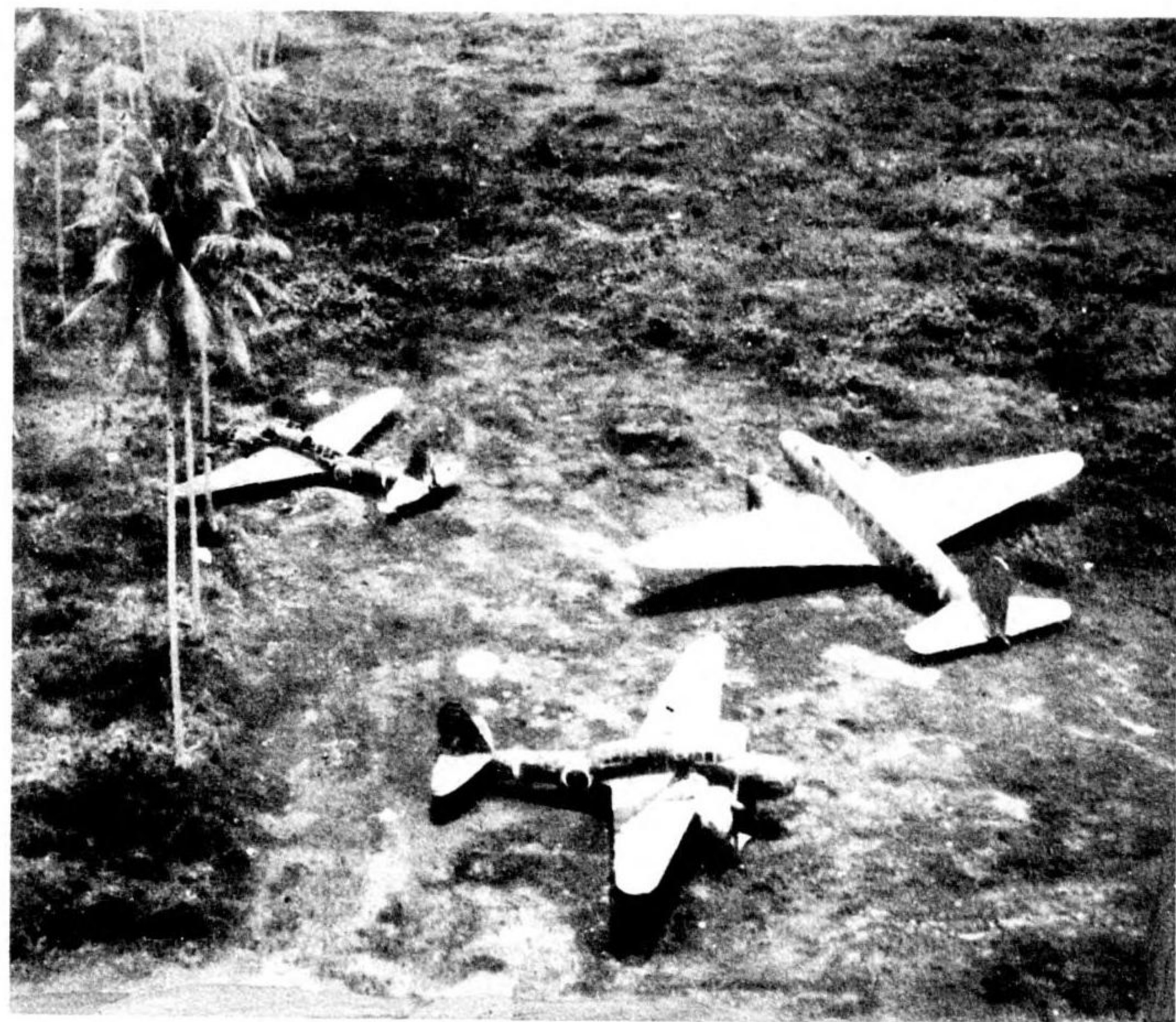


Photo Scale 1:4820

LILY, TONY and OSCAR above. Note the stubby engines on the LILY.

LILY



The canopy of LILY may take several shapes. The type shown in the photos on this page has two distinct greenhouses separated by a solid section. Variations from this include a gun turret built into the after portion of the rear greenhouse and the elimination of the solid section to create an all-glass canopy.

- NAKAJIMA O2
- RECONNAISSANCE-FIGHTER
- S - 55' 9"
- L - 39' 11"

"IRVING"

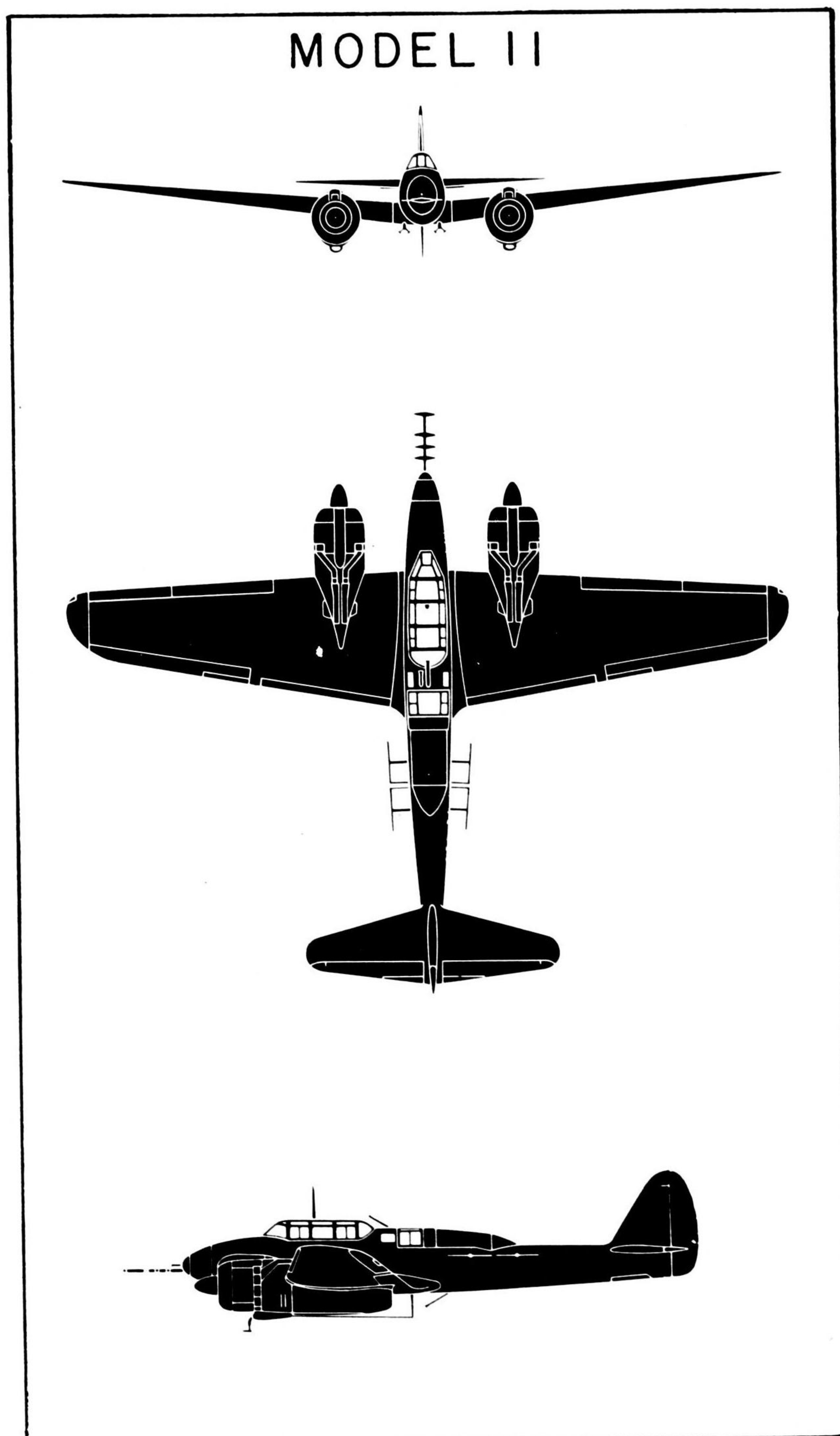


Photo Scale 1:1950

Identification Data

- Low-wing monoplane.
- Engine nacelles protrude exceptionally far forward of leading edge of wing.
- Pointed fuselage nose projects even with underslung engine nacelles.
- Narrow wing with slight taper on leading edge, moderate taper on trailing edge, cutback tips.
- Very slim fuselage narrowing fore and aft.
- Tailplane has wide span, is evenly tapered.
- Raised greenhouse canopy extends aft from leading edge of wing to a point midway between tailplane and trailing edge of wing.

IRVING is one of three Japanese planes specifically equipped for dual purpose work. Originally designed as a land fighter, IRVING was first accepted into service as a land reconnaissance plane and later converted to a night fighter.

IRVING

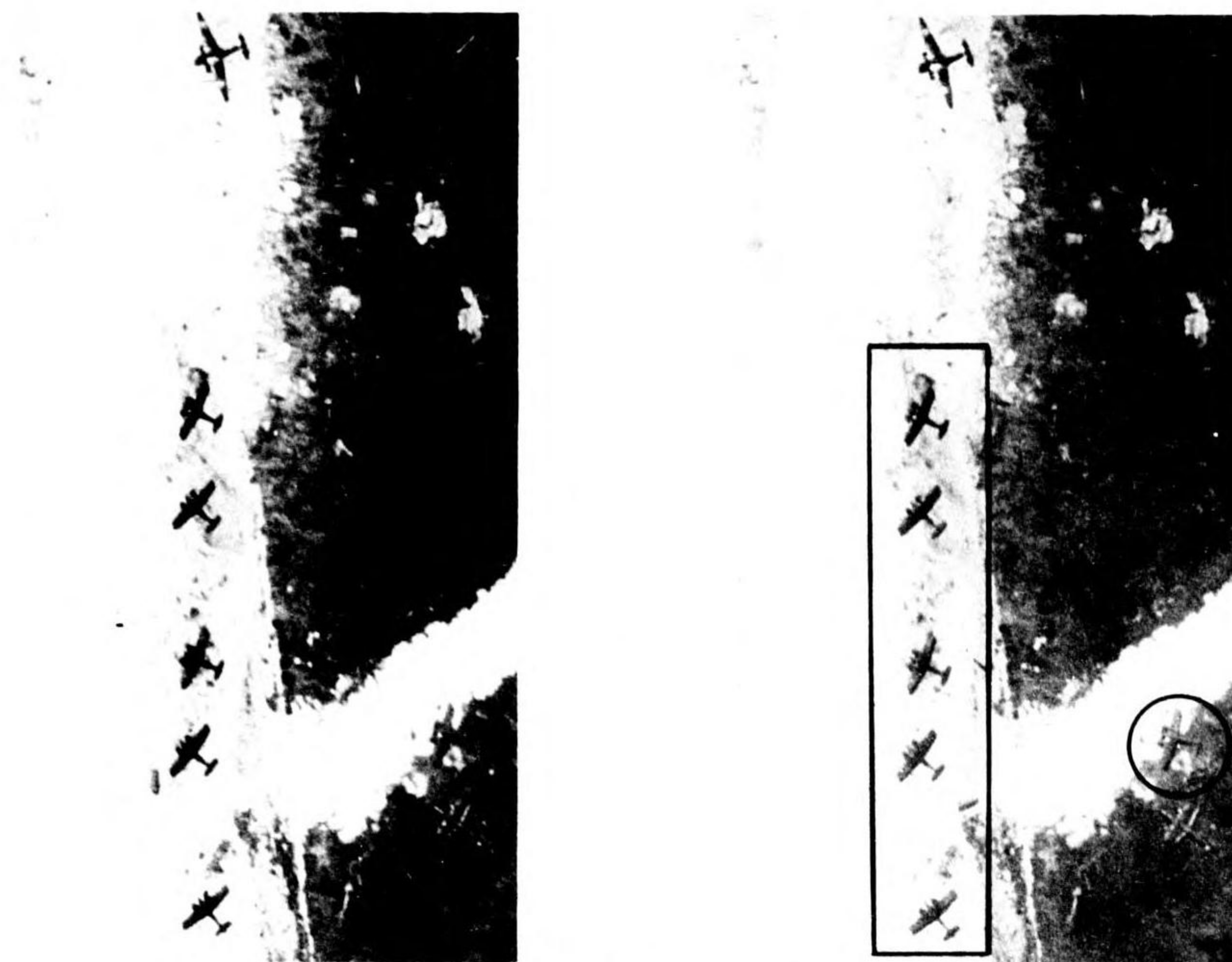


Photo Scale 1:3345

Six IRVING's and one NELL at Guam above. Note the extremely thin, pointed fuselage and the long engine nacelles projecting forward of the wing. The nacelles and the tapered tailplane of wide span distinguish IRVING from NICK and DINAH.

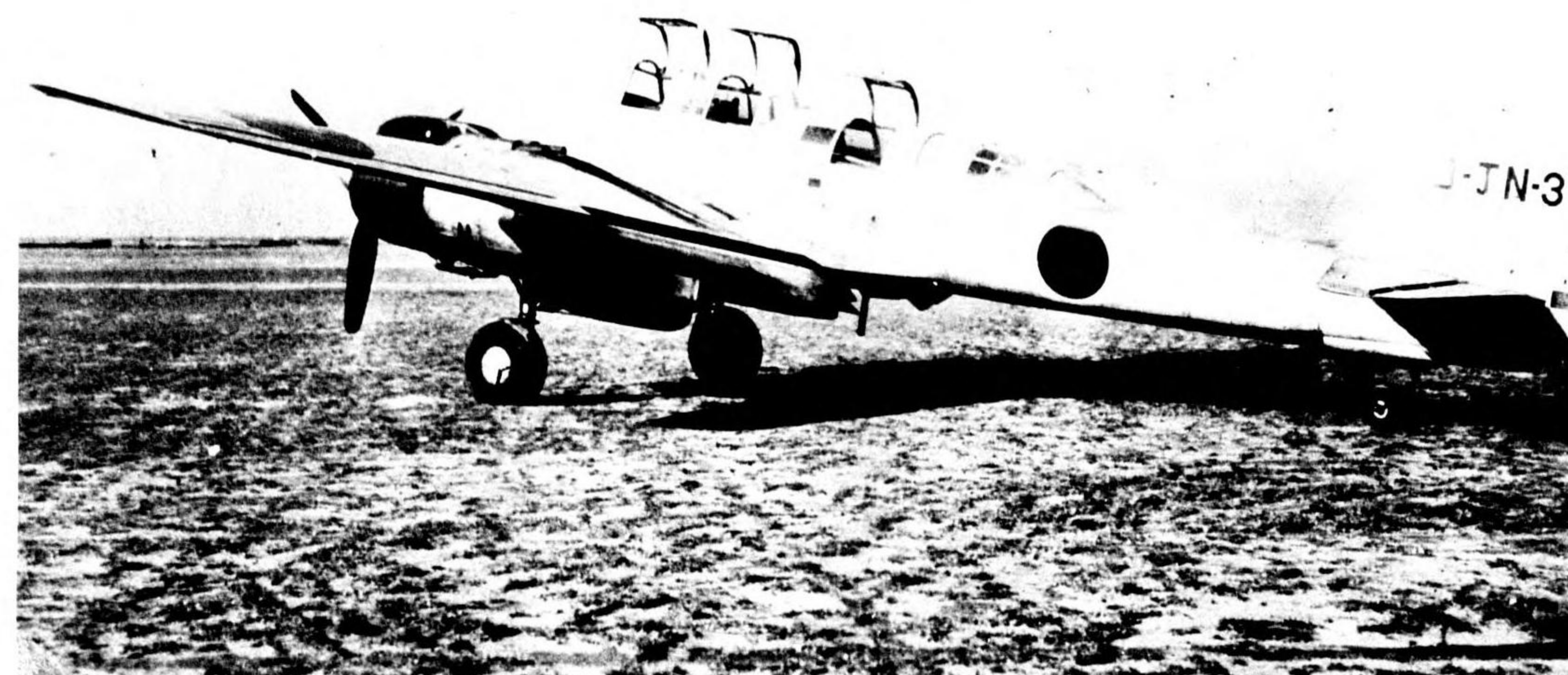


Photo Scale 1:9295

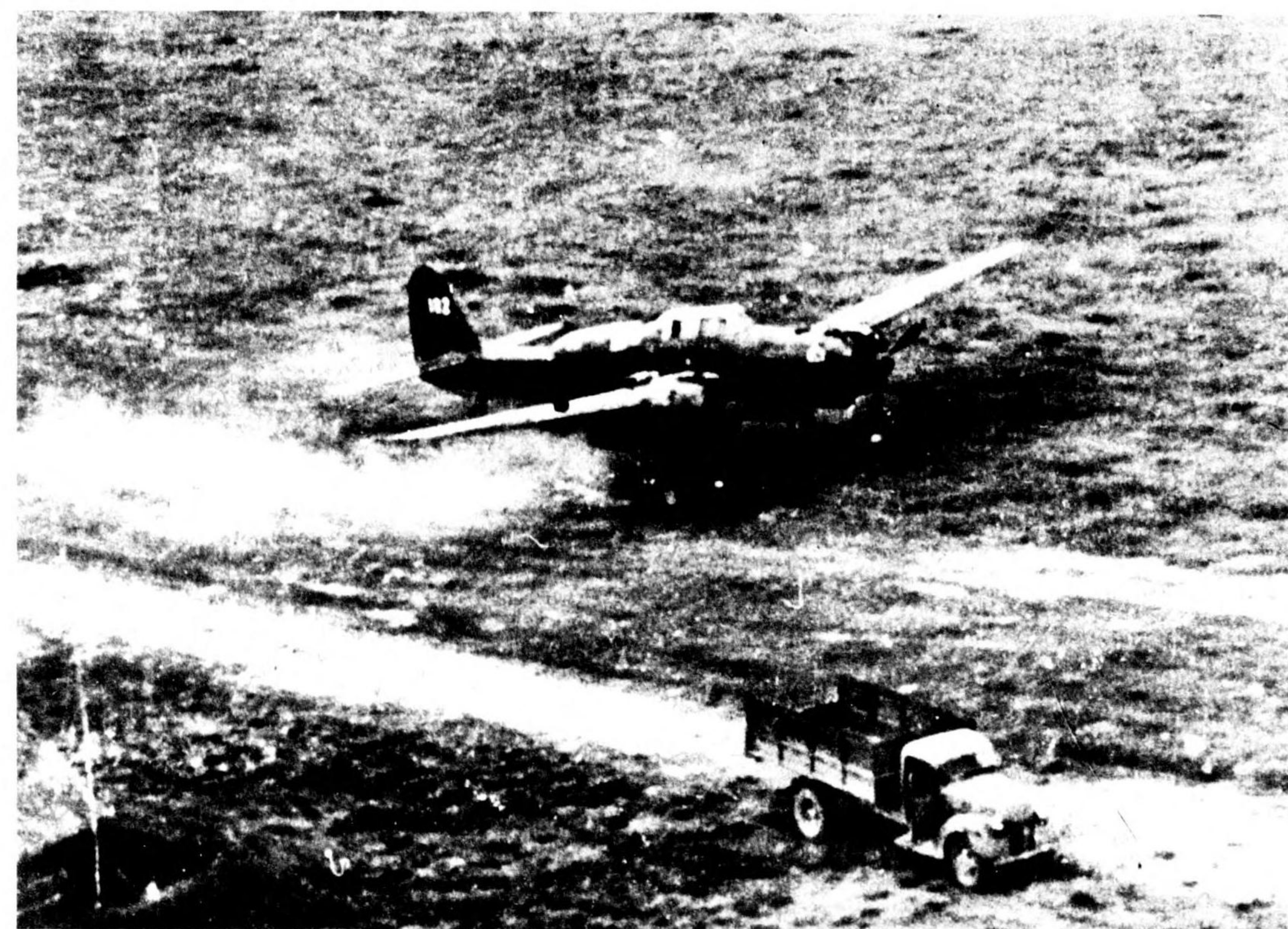
Four IRVING's at Yap. The five larger twin-engine planes are FRANCES', very similar in outline. IRVING can be seen to be of low-wing construction, FRANCES' of mid-wing construction.



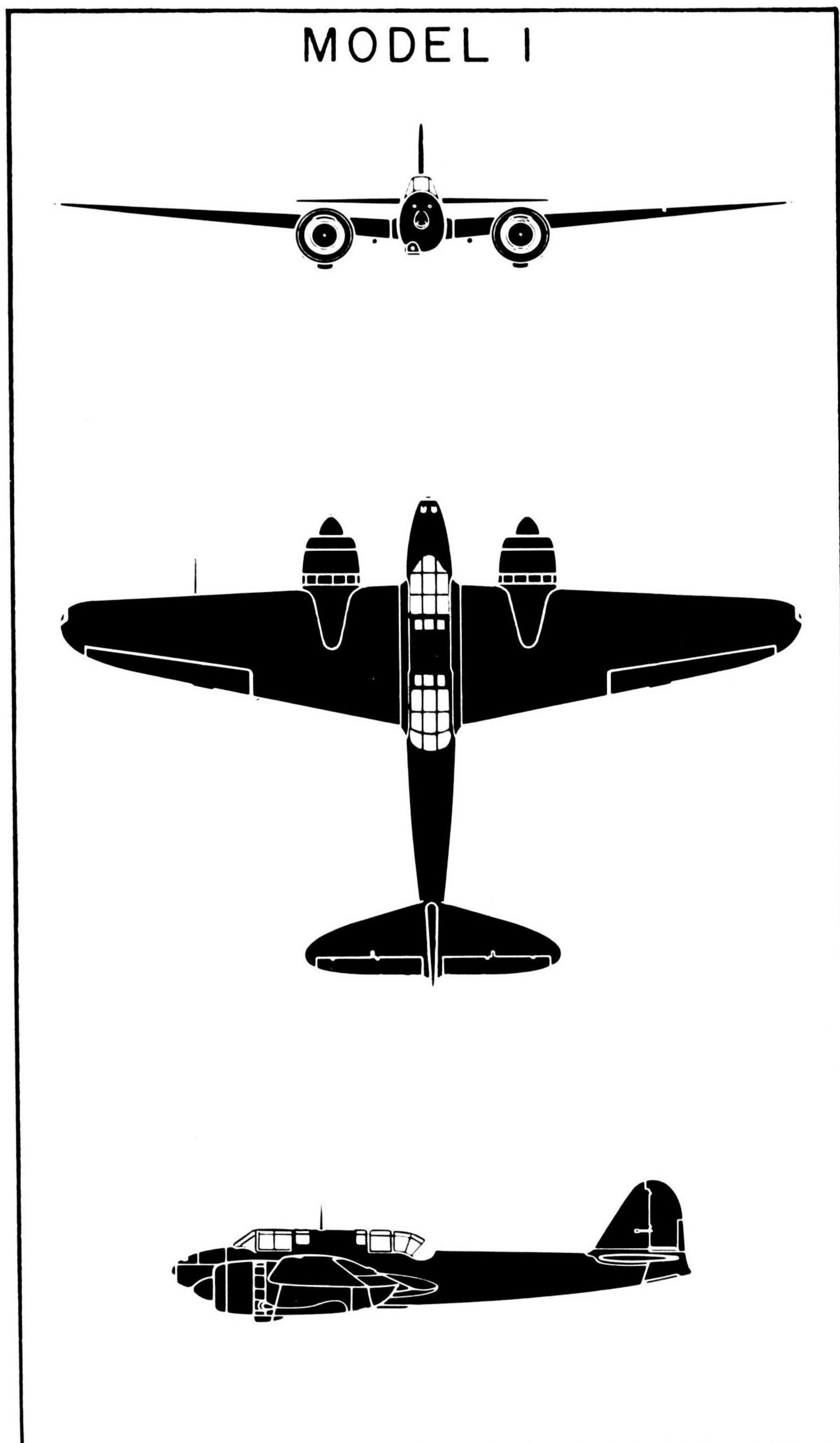
Photo Scale 1:6635



Note the long, stepped canopy on IRVING above and below. This is an important feature in distinguishing IRVING from FRANCES'. The slim, pointed fuselage nose may or may not have a small glass tip.



- KAWASAKI 02
- FIGHTER
- S-49' 6"
- L-34' 8"



RESTRICTED

"NICK"

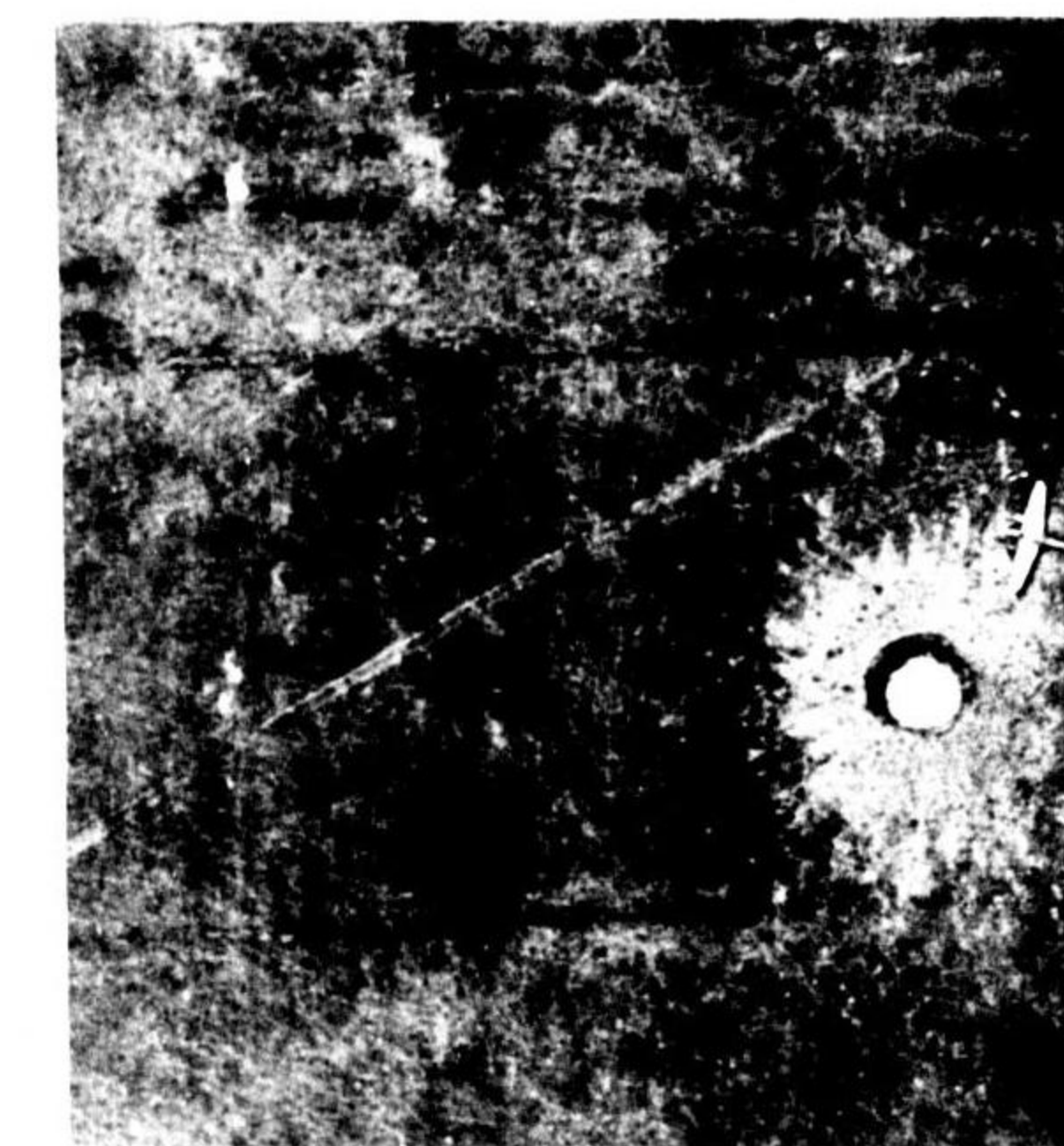
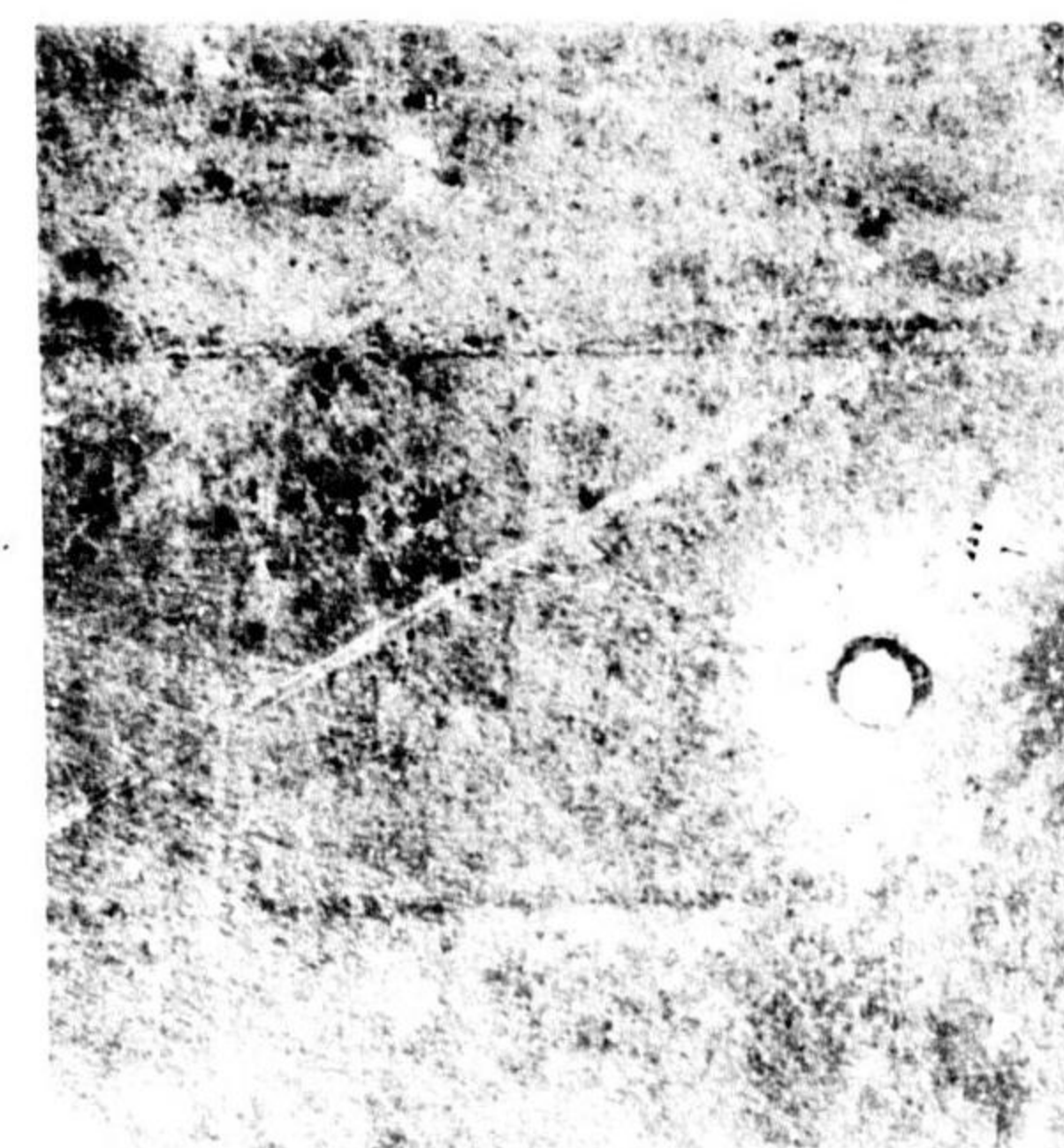


Photo Scale 1:2825

Identification Data

- Low mid-wing monoplane.
- Pointed, solid fuselage nose projects slightly forward of stubby engine nacelles.
- Narrow wing with moderate taper on leading edge, sharp taper on trailing edge, rounded tips.
- Slim fuselage narrowing fore and aft.
- Tailplane of medium span has roughly a semi-elliptical shape.
- Engine nacelles extend above wing surface halfway to trailing edge of the wing.
- Rear cockpit ends at trailing edge of wing.

NICK is also used as a light bomber and as a ground attack plane.

NICK

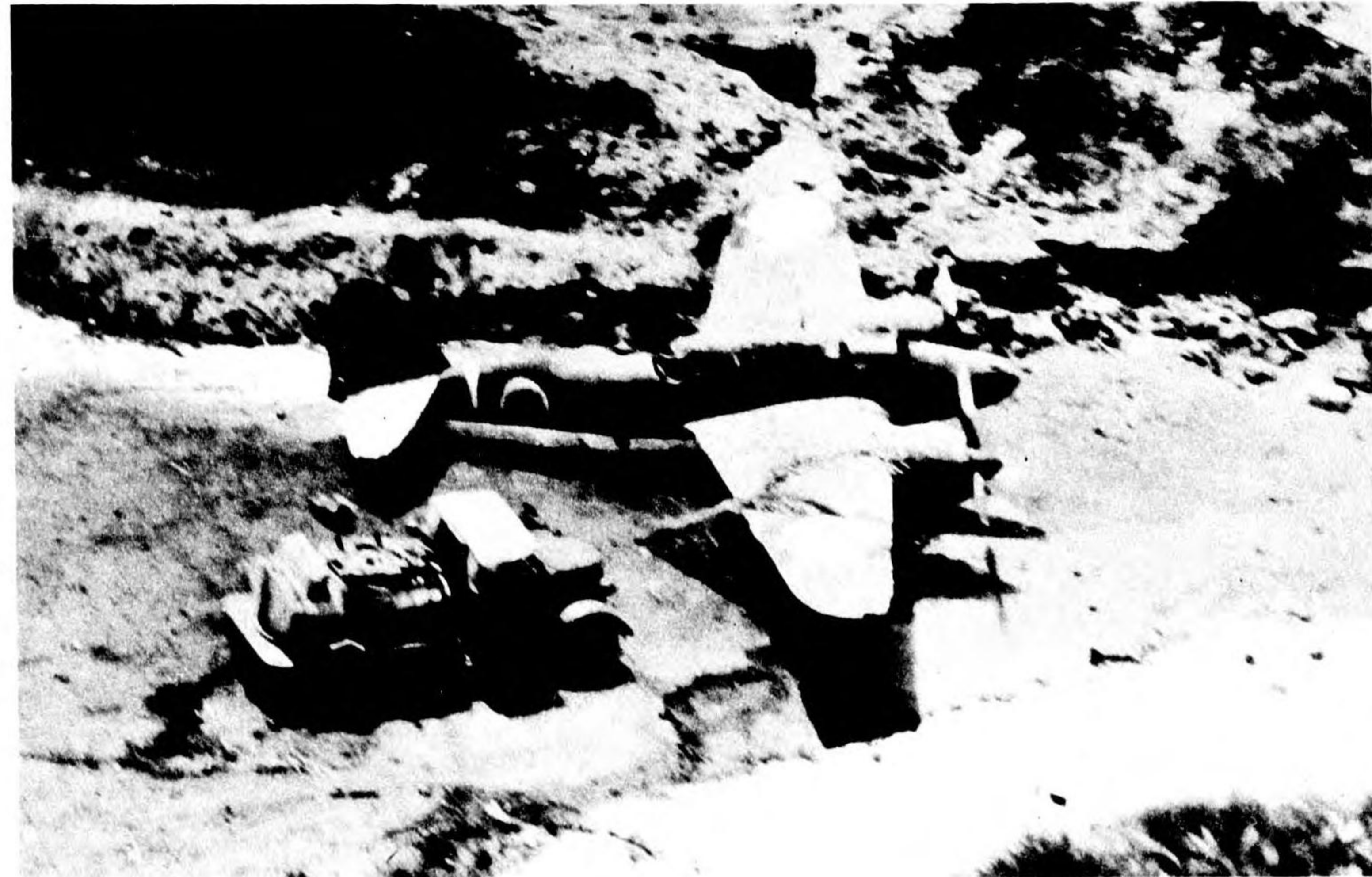
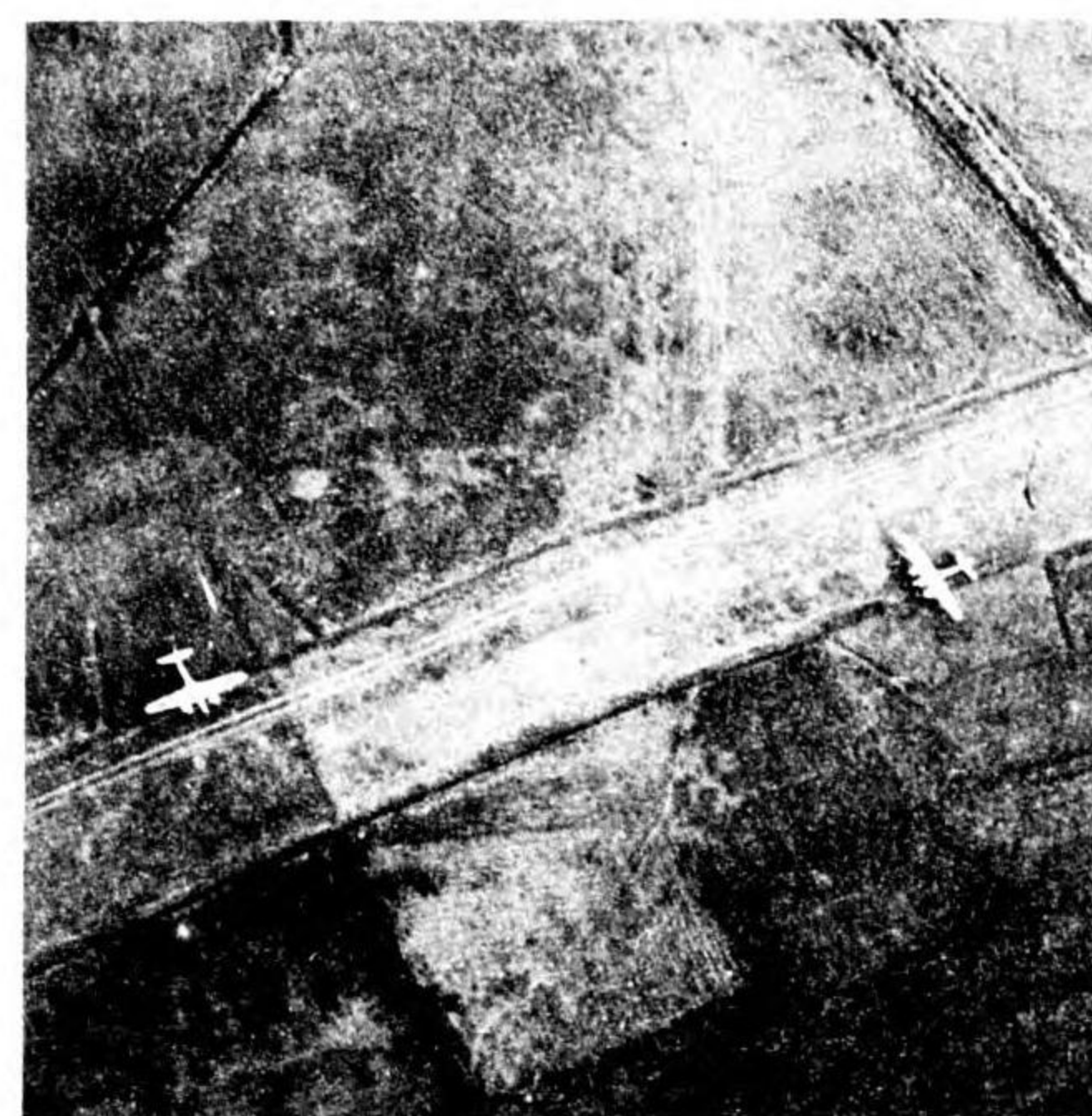


Photo Scale 1:5035

Note the low mid-wing construction of the two NICK's above -- the fuselage stands up well above the wing surface. The stubby engines and semi-elliptical tailplane distinguish NICK from IRVING. NICK's rear cockpit ends at the trailing edge of the wing while the rear cockpits on DINAH and IRVING extend further aft. To further distinguish DINAH see page 2.28.



Photo Scale 1:4865



- MITSUBISHI 100
- RECONNAISSANCE
- S-48' 4"
- L-36' 3"

"DINAH"

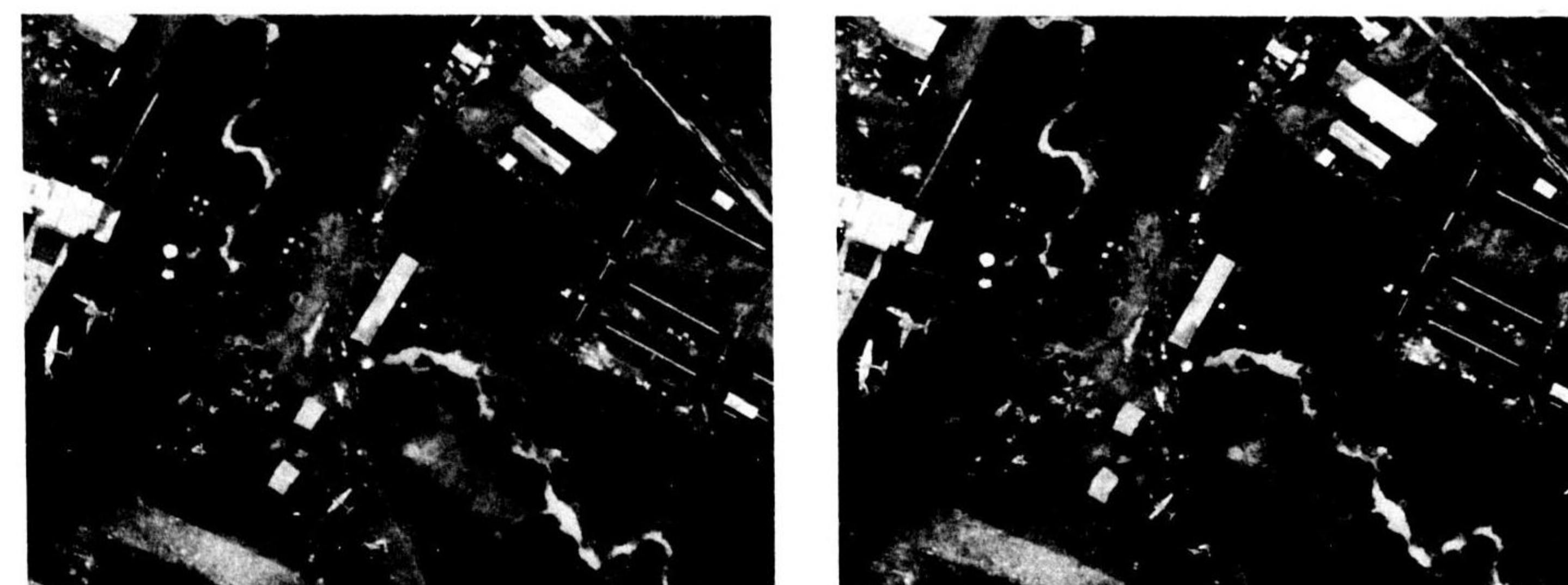
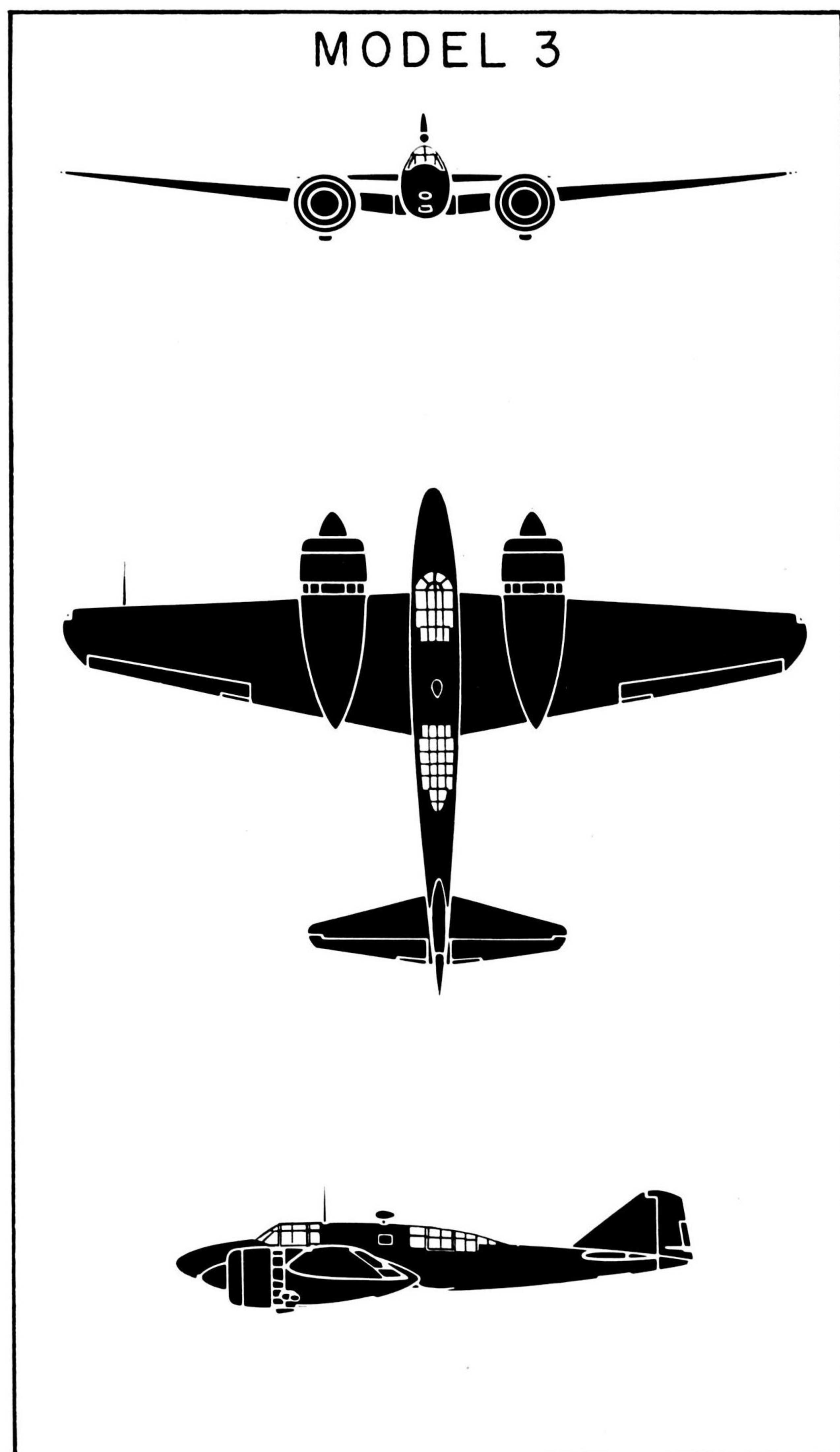


Photo Scale 1:5580

Identification Data

- Low-wing monoplane.
- Pointed, solid fuselage nose projects slightly forward of engine nacelles.
- Narrow wing with moderate taper on leading edge, sharp taper on trailing edge, rounded tips.
- Engine nacelles extend above wing surface to trailing edge of wing on Model 1, slightly aft of trailing edge on Model 3.
- Slim fuselage narrowing fore and aft.
- Tailplane has even taper, rounded tips.
- Rudder projects slightly aft of tailplane.
- Vertical fin and rudder has wide base, trapezoidal shape.
- Rear cockpit extends well aft of trailing edge of wing.

DINAH is used by both the Army and the Navy.

DINAH

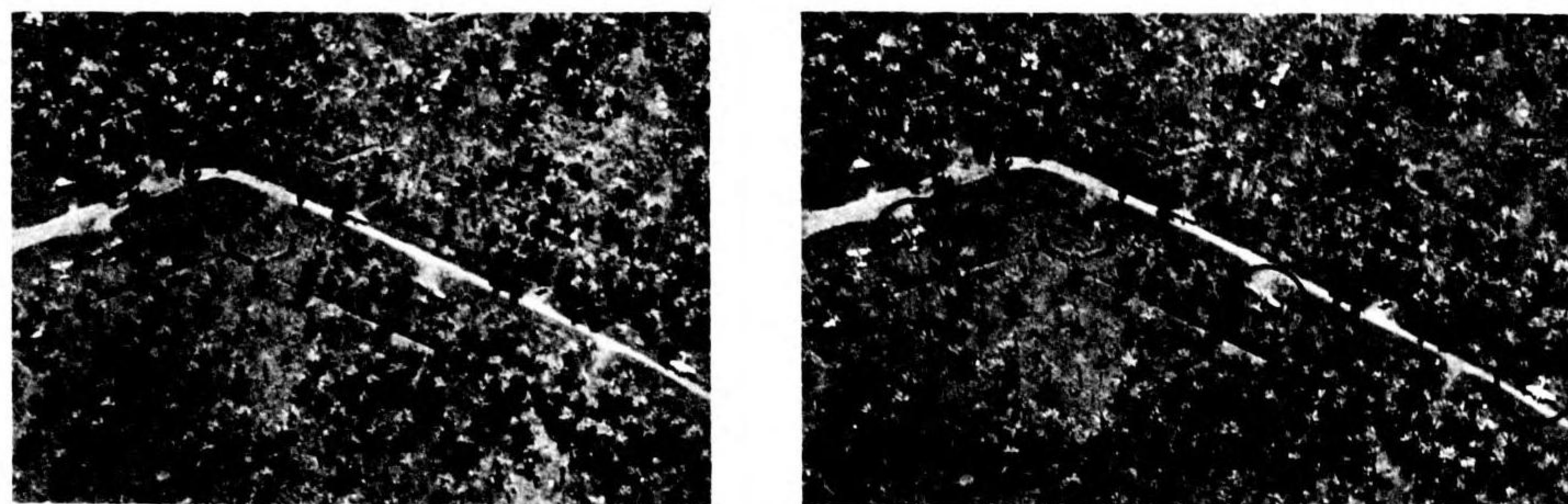


Photo Scale 1:5525

With higher magnification the engine nacelles on the three planes above can be seen to extend to the trailing edge of the wing. That is a sure test for DINAH. Other points to note are the slim, tapered tailplane with the rudder extending slightly aft and the position of the rear cockpit aft of the trailing edge of the wing. These distinguish DINAH from NICK. In addition, the fuselage of DINAH stands higher above the wing surface indicating a lower wing construction than on NICK. Use as high a magnification as possible to distinguish DINAH from similar planes.



Photo Scale 1:5630



Photo Scale 1:8650

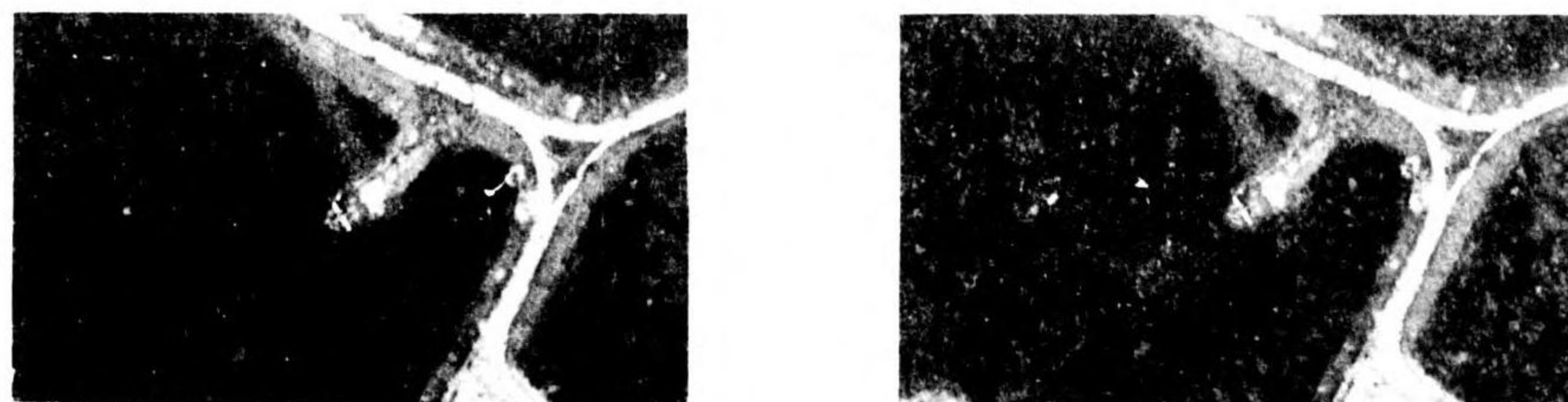
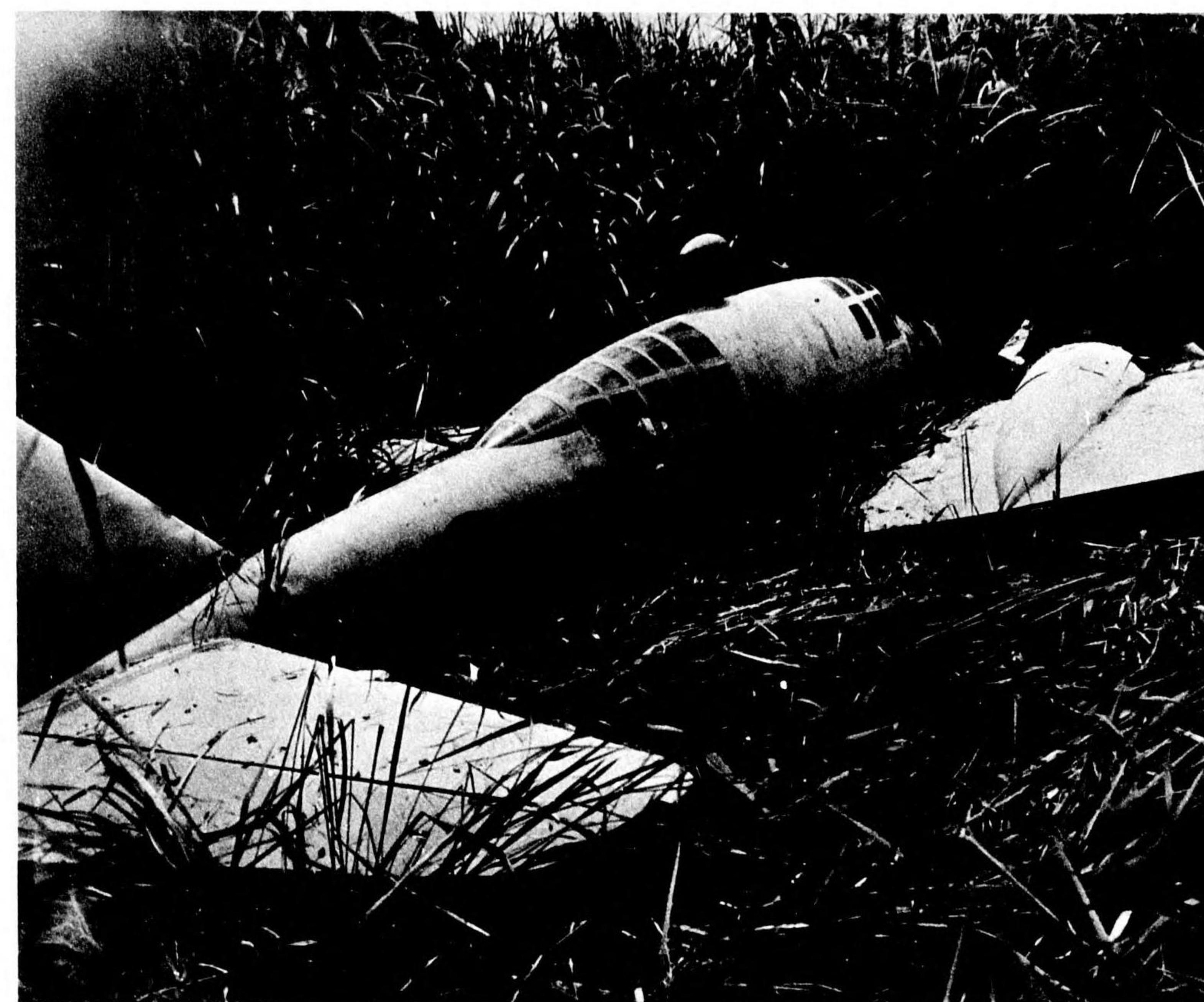


Photo Scale 1:6745



The size and position of the two greenhouses and the extension of the engine nacelle above the wing surface are illustrated above. See FRANCES, LILY, IRVING and NICK for similar planes.



Note the distinctive vertical fin and rudder of DINAH. It has a trapezoidal shape with a wide base. The plane at the left has the fuselage nose covered with canvas.

SECTION - 3

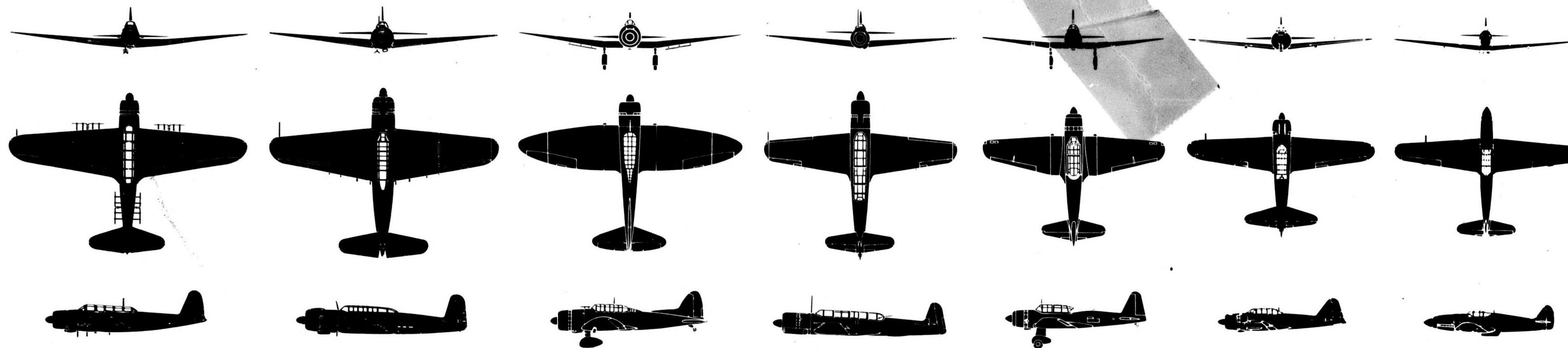
3.01 3.99

SINGLE - ENGINE LANDPLANES

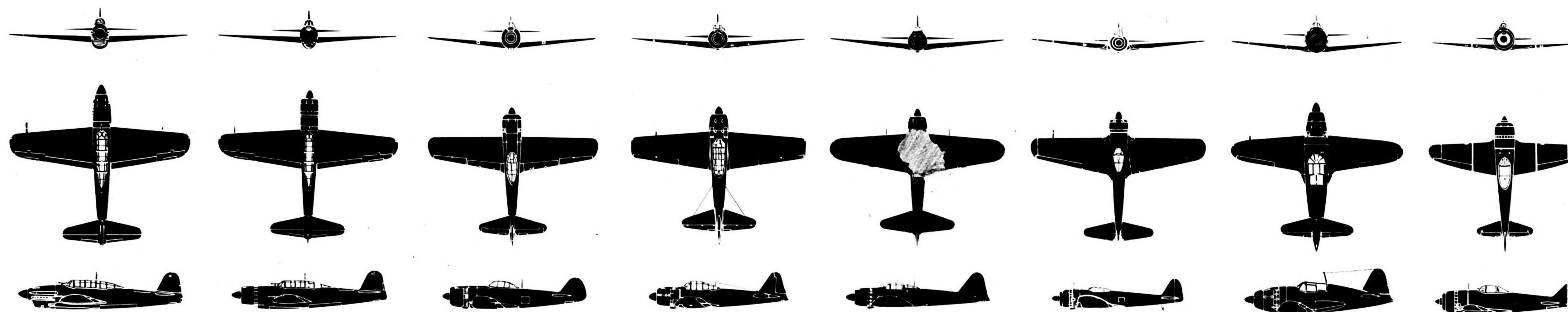
RESTRICTED

SILHOUETTES

TO SCALE 1" = 30'



KATE 12	JILL 12	VAL 22	MYRT 11	SONIA 1	ZEKE 21	TONY 1
Navy Torp. Bomber	Navy Torp. Bomber	Navy Dive Bomber	Navy Recce.	Army Recce.	Navy Fighter	Army Fighter
S - 50' 11"	S - 49'	S - 47' 7"	S - 41' 1"	S - 39' 10"	S - 39' 3"	S - 39' 4"
L - 34' 3"	L - 36' 1"	L - 35' 5"	L - 36' 6"	L - 30' 2"	L - 29' 9"	L - 28' 9"



JUDY 11	JUDY 33	FRANK 1	ZEKE 32	ZEKE 52	OSCAR 2	JACK 11	TOJO 2
Navy DB-Recce.	Navy DB-Recce.	Army Fighter	Navy Fighter	Navy Fighter	Army Fighter	Navy Fighter	Army Fighter
S - 37' 9"	S - 37' 10"	S - 37' 1"	S - 36' 2"	S - 36' 2"	S - 35' 7"	S - 35' 5"	S - 31'
L - 33' 7"	L - 33' 6"	L - 32' 4"	L - 29' 9"	L - 29' 9"	L - 29' 3"	L - 31' 9"	L - 29' 3"

"KATE"

- NAKAJIMA 97
- TORPEDO BOMBER
- S - 50' 11"
- L - 34' 3"

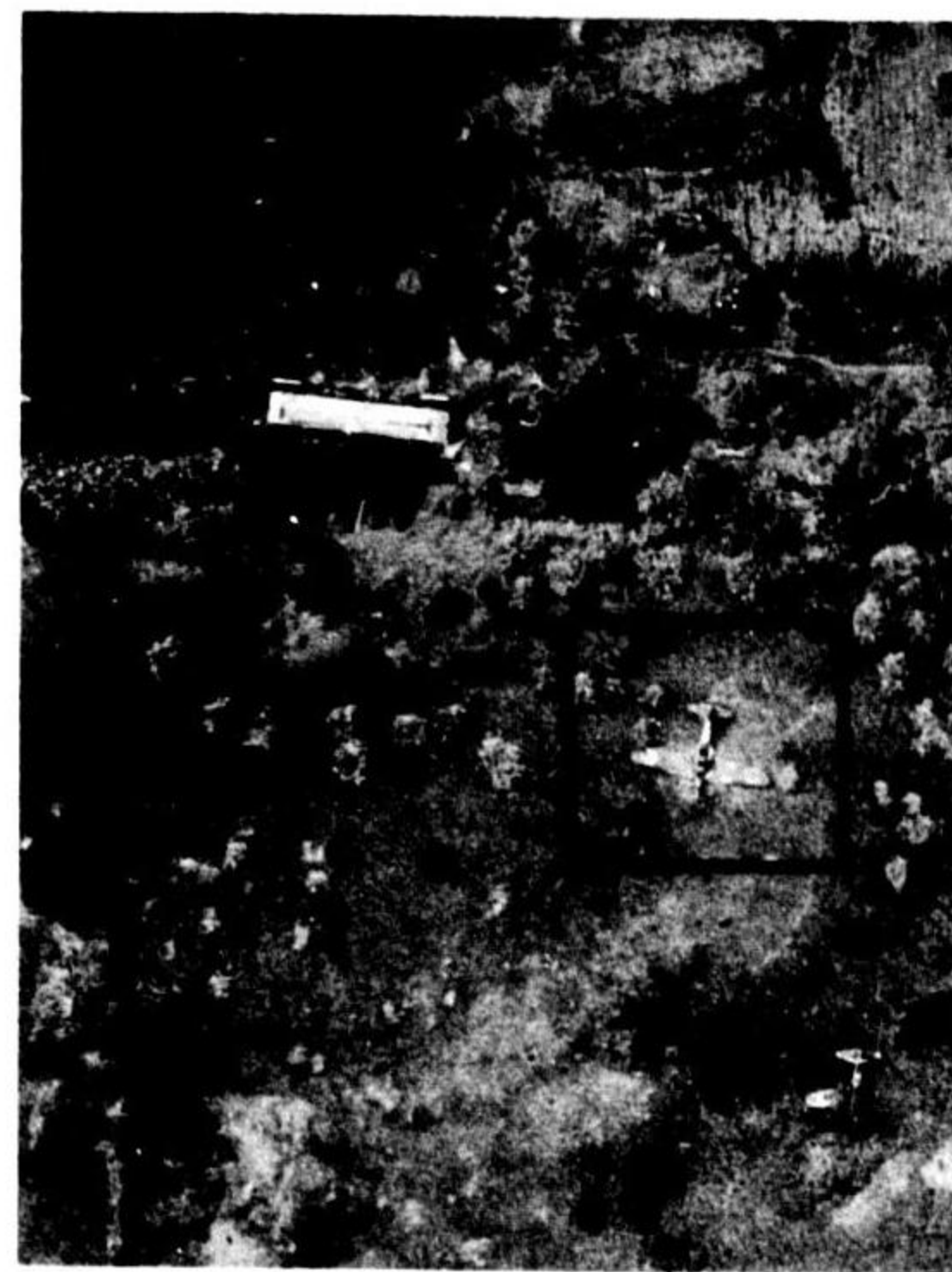


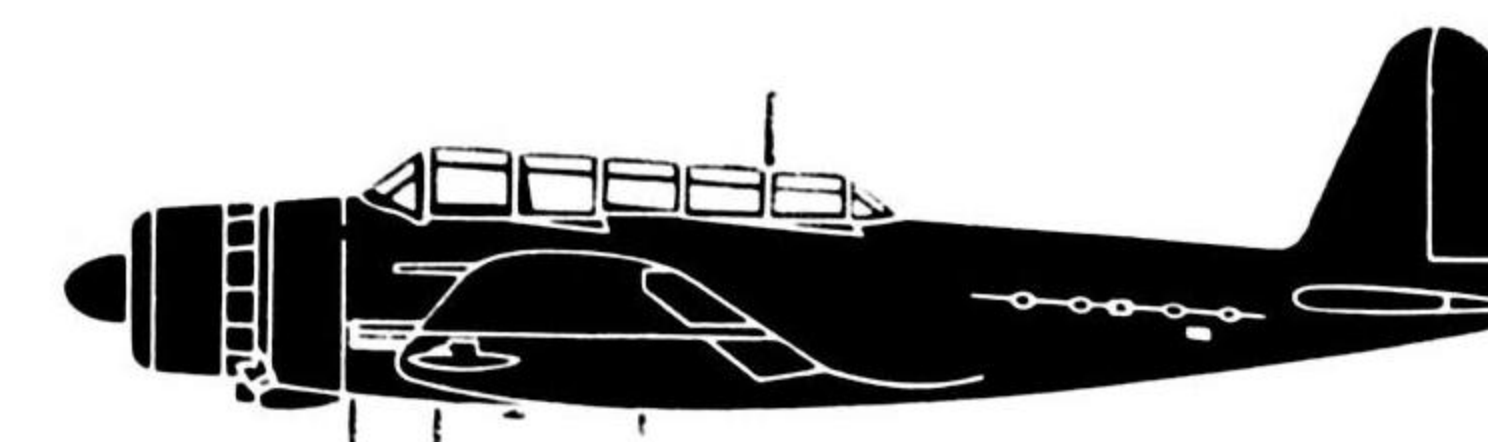
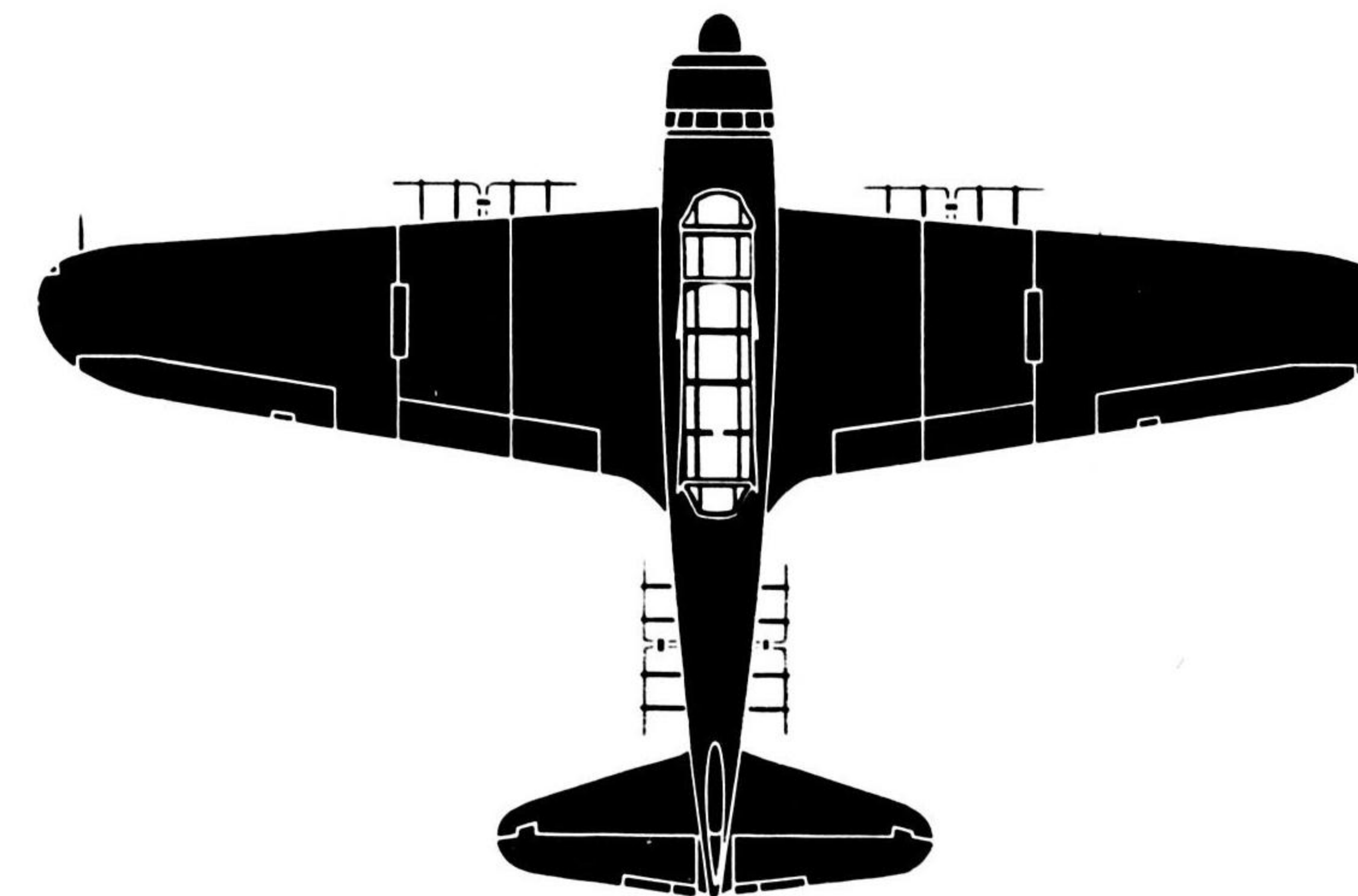
Photo Scale 1:2300

Identification Data

- Wing has a thick root chord and an even, straight taper on the leading and trailing edges.
- Wing tips are rounded with trailing edge swept forward slightly at tip.
- Radial engine protrudes well forward of wing.
- Engine and fuselage appear slender in relation to width and span of wing.
- Long greenhouse extends width of wing.
- Leading edge of tailplane has sharp taper, trailing edge moderate taper.

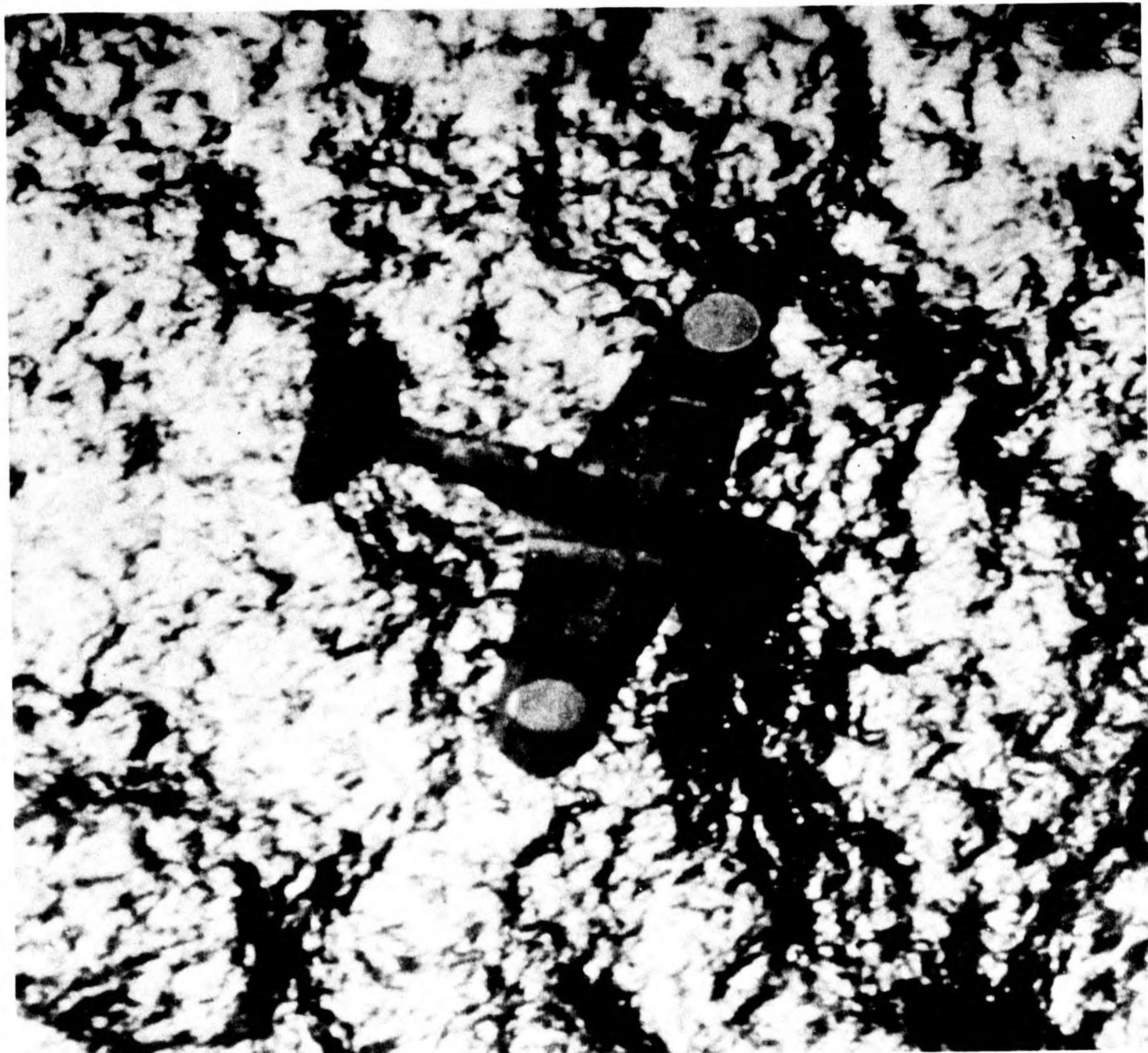
KATE is also used as a light bomber.

MODEL 12



RESTRICTED

KATE



KATE was the standard carrier-borne torpedo bomber of the Japanese Navy until largely replaced by JILL. KATE proved too slow and vulnerable to press home successful attacks. KATE and JILL are very similar in design. To distinguish the two planes see page 3.05.



RESTRICTED



Photo Scale 1:4850

Four KATE's at Iwo Jima in the Kazan Retto. Note the small, triangular tailplane. The smaller planes nearby are JUDY's and JACK's.

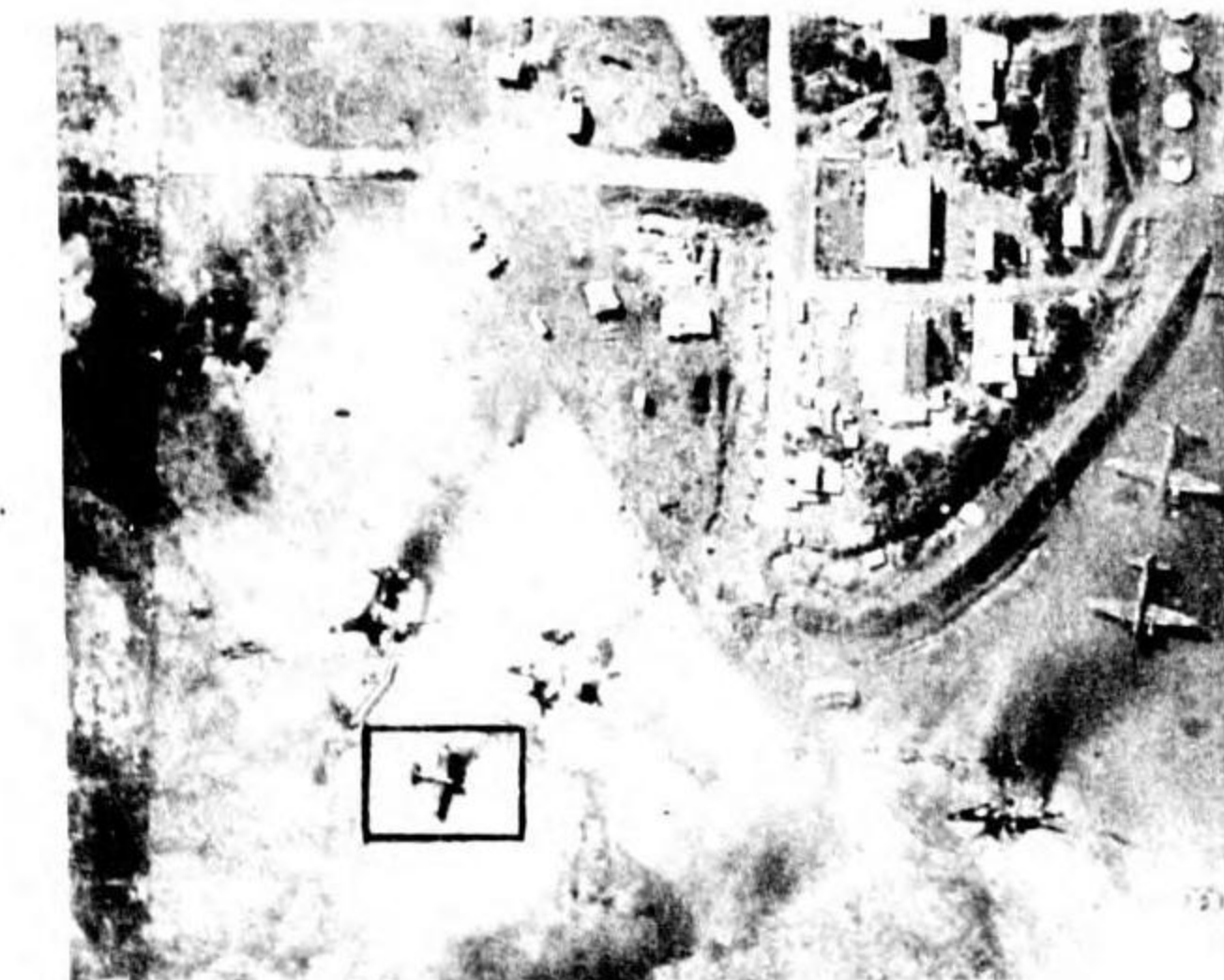


Photo Scale 1:4920

To identify KATE look for the small, triangular tailplane, the long greenhouse and the fat, tapered wing with slim engine nacelle projecting forward.



Photo Scale 1:8250

"JILL"



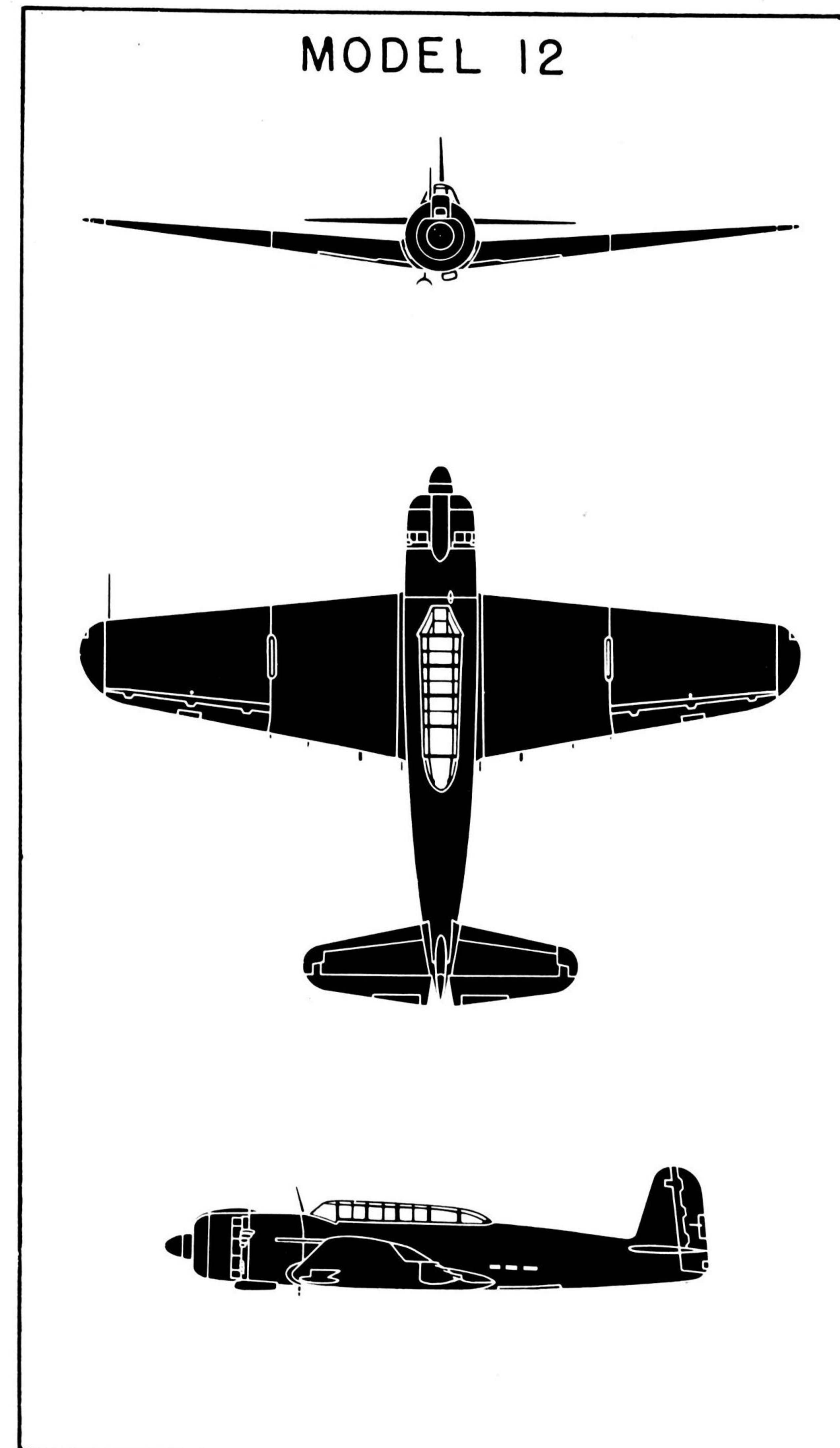
Photo Scale 1:2695

Identification Data

- Wing has thick root chord and a slight taper on the leading edge, moderate taper on the trailing edge.
- Wing tips are rounded with trailing edge swept forward slightly.
- Radial engine protrudes well forward of wing.
- Tailplane is slender, has wide span.
- High vertical fin and rudder.
- Long greenhouse extends width of wing.

JILL is also used as a light bomber.

- NAKAJIMA O2
- TORPEDO BOMBER
- S - 49'
- L - 36' 1"





JILL was designed as a torpedo bomber to replace KATE. In plan view the two planes are very similar with JILL being best distinguished by its slim tailplane of wide span. KATE has a small, fat tailplane of triangular shape. If the shape can not be determined, a measurement of the tailplane relative to the wing span will distinguish between KATE and JILL. The tailplane on JILL has a span of 18' 9" while the tailplane on KATE has a span of only 16' 5". Both planes have a fat wing of similar span and a slim engine projecting well forward of the wing. In oblique view JILL is distinguished by its tall vertical fin and rudder and straight dihedral to the wing. KATE has a short fin and rudder and the wing dihedral begins some distance outboard of the engine.

JILL is both carrier-based and land-based. The wings fold upward midway between the fuselage and wing tips. Note the four-bladed propeller and the Fowler flap slide rails extending aft of the trailing edge of the wing.

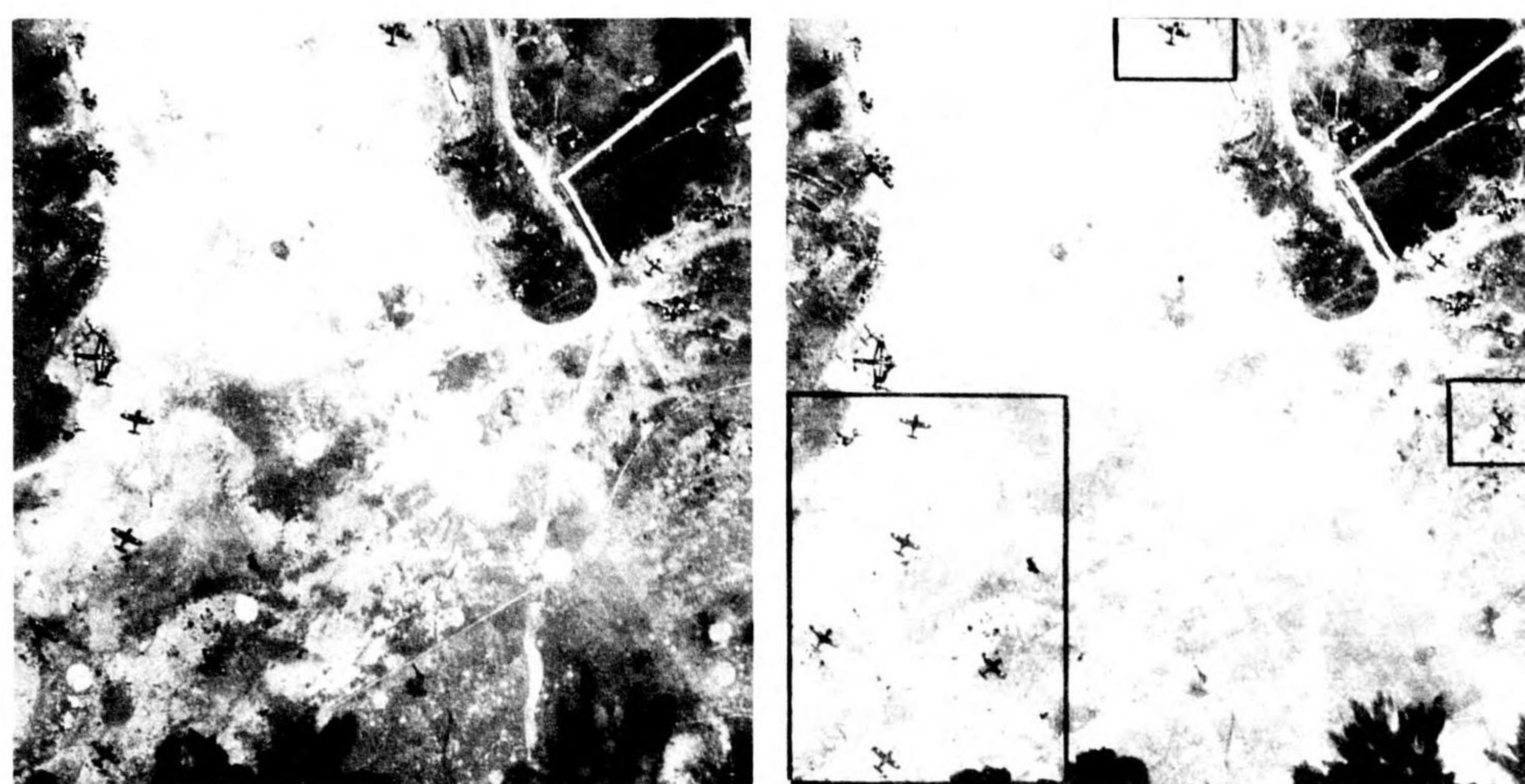


Photo Scale 1:5585



Photo Scale



1:5490



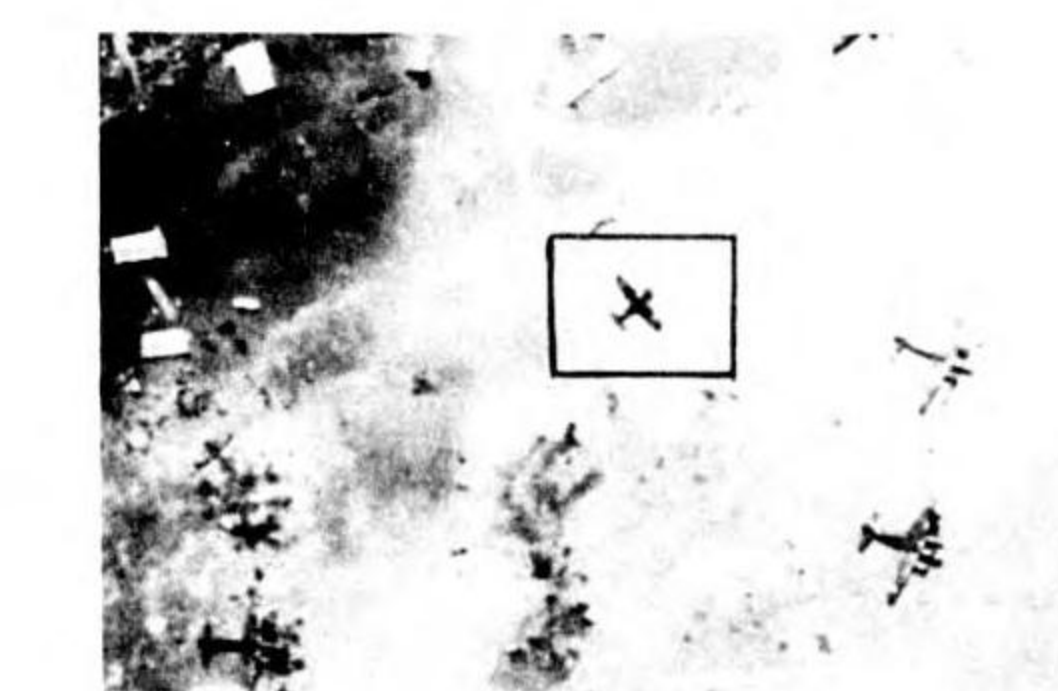
Photo Scale



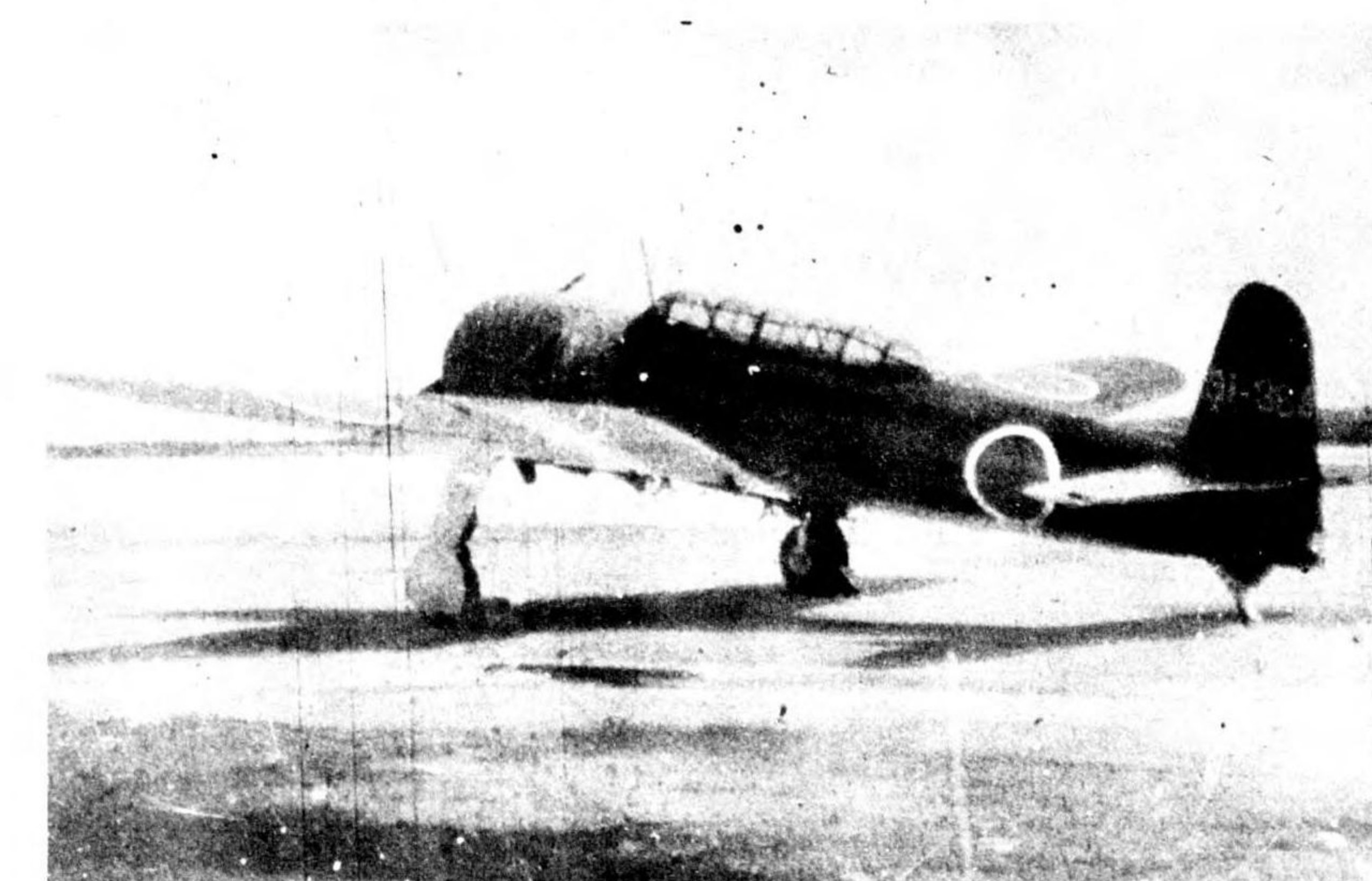
1:4705



Photo Scale



1:5290



"VAL"

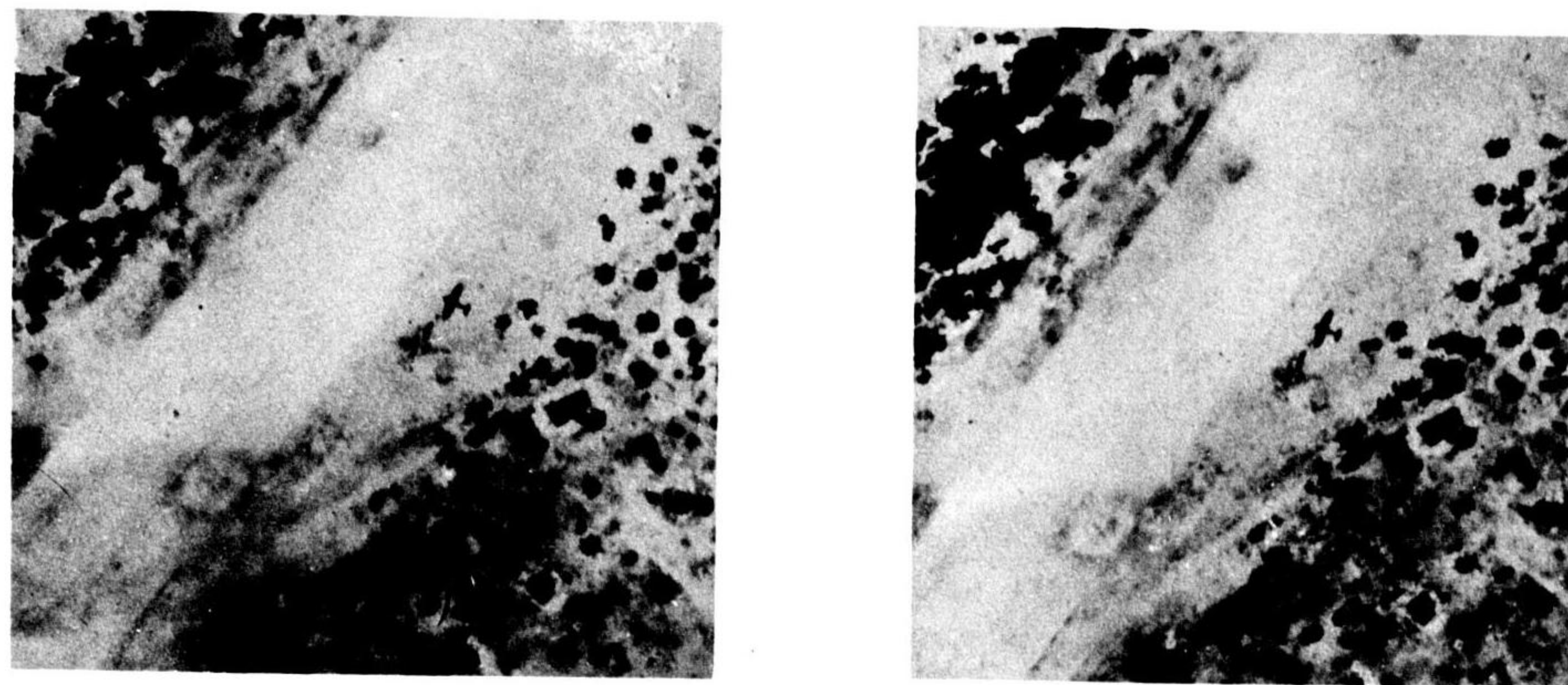
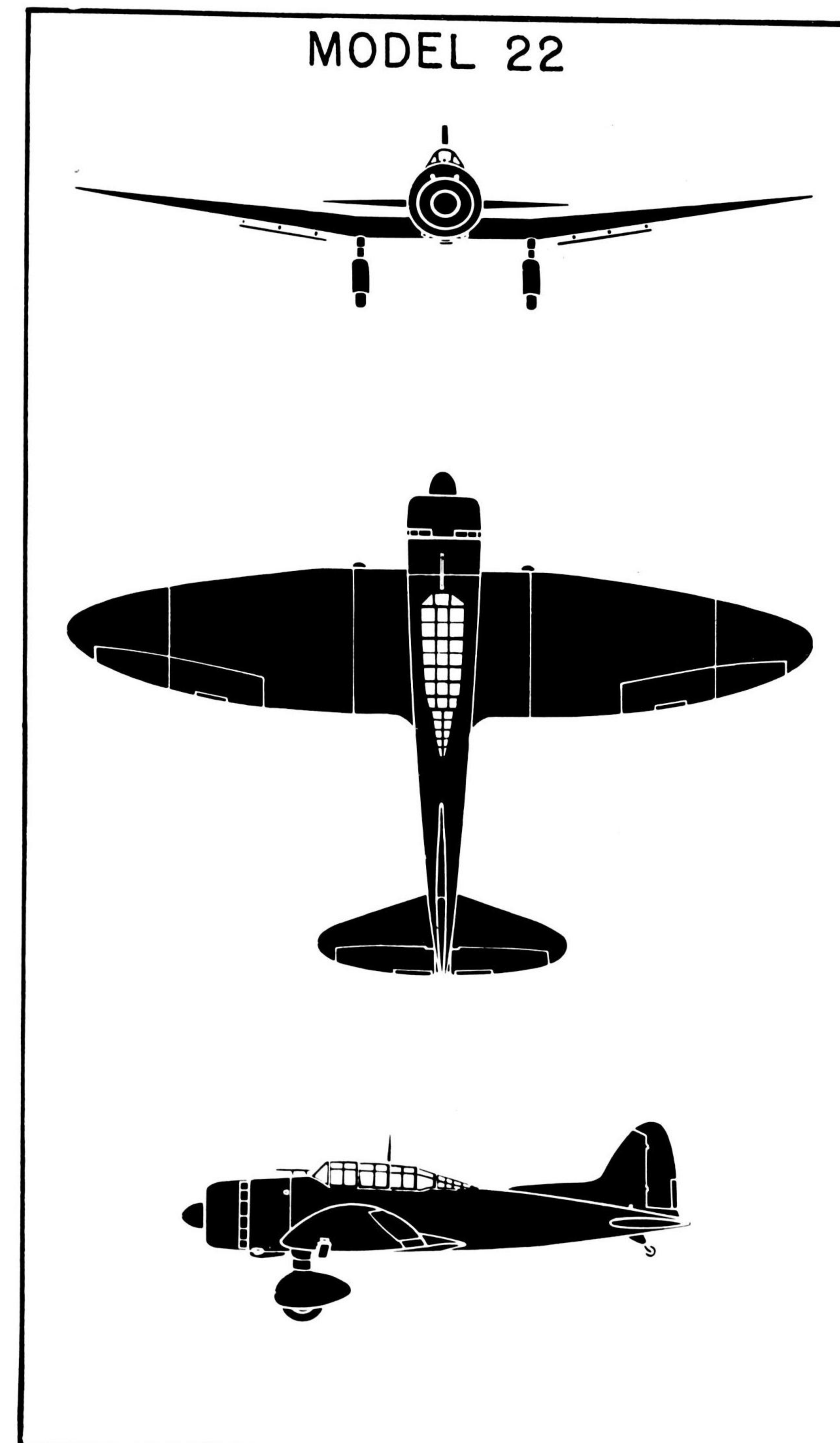


Photo Scale 1:4710

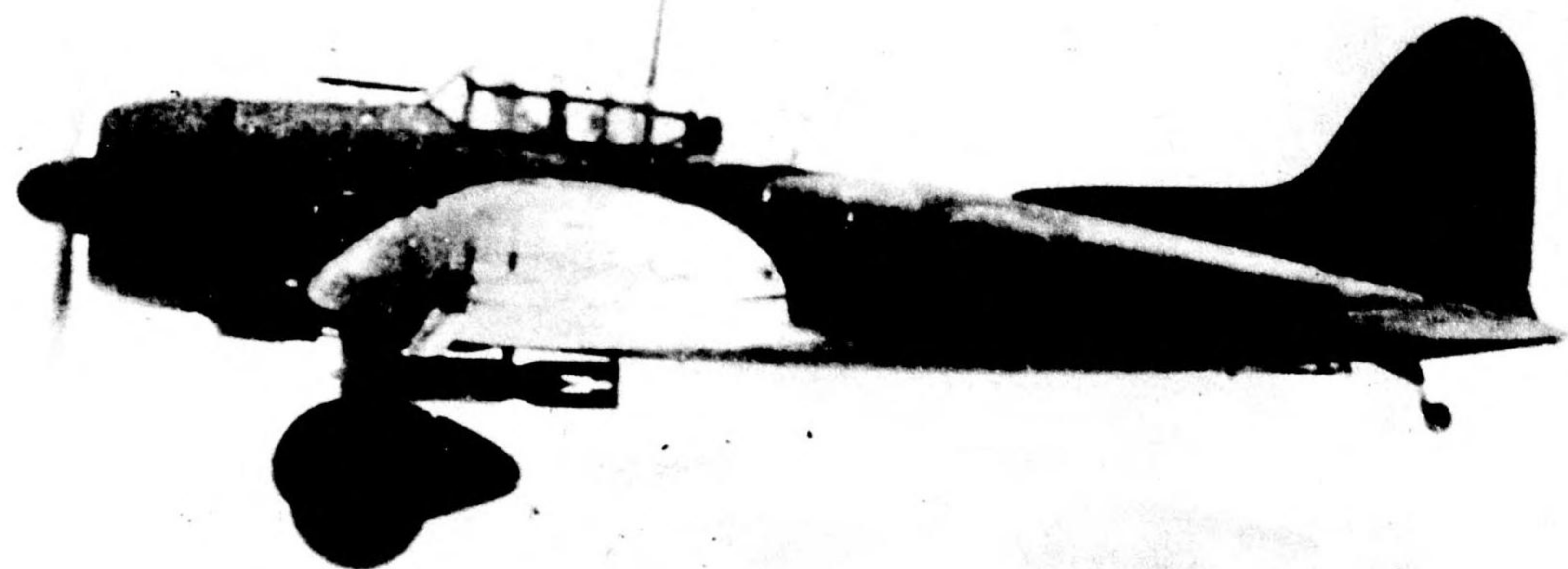
Identification Data

- Wings are elliptical in shape, tips sharply rounded.
- Radial engine protrudes well forward of wing.
- Slim fuselage.
- Leading edge of tailplane has straight taper, trailing edge is elliptical.
- Long greenhouse.
- Vertical fin and rudder has long fairing extending forward into fuselage.
- Wings fold upwards for carrier use.
- Landing gear is non-retractable.

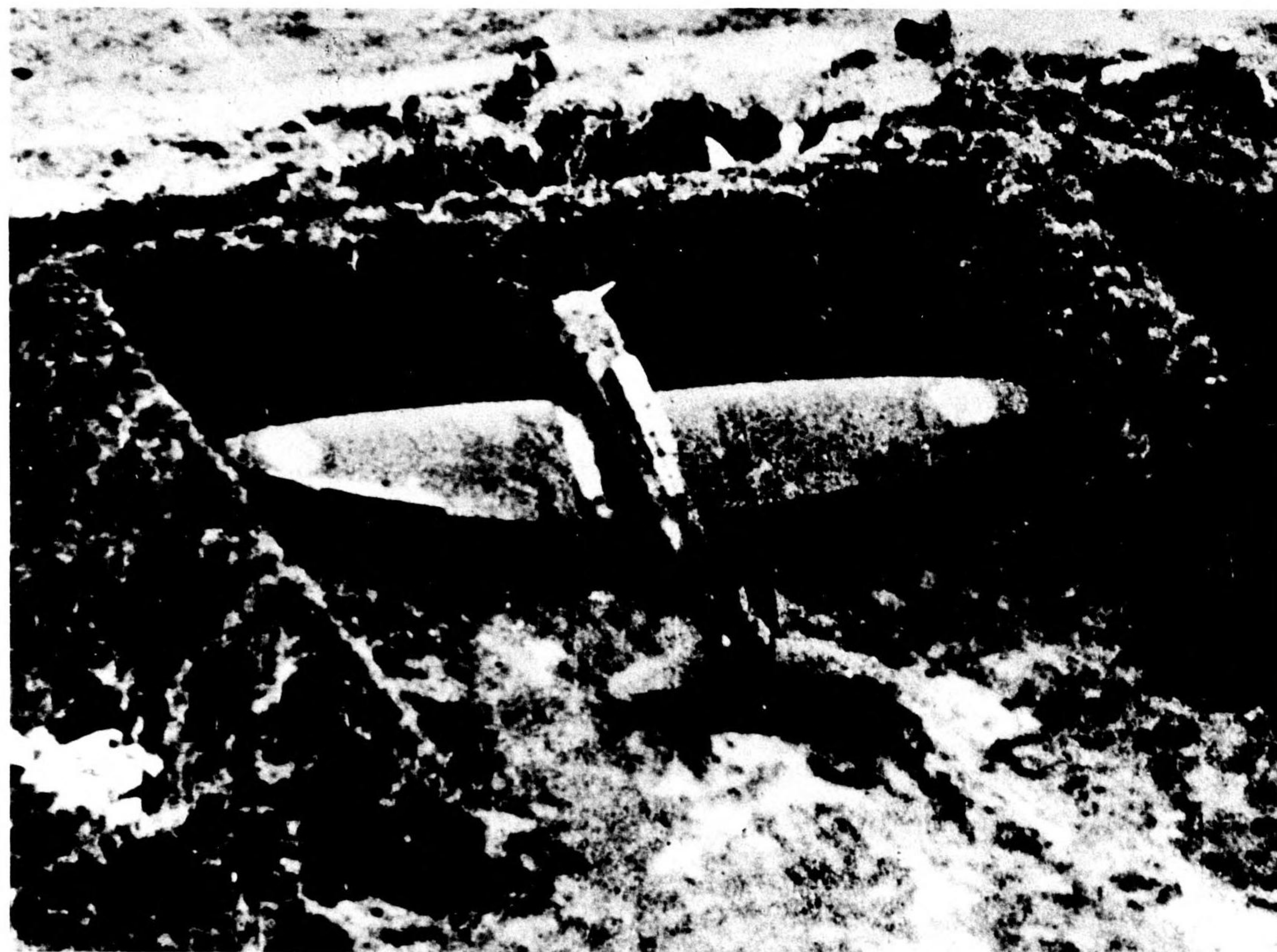
- AICHI 99
- DIVE BOMBER
- S - 47' 7"
- L - 35' 5"



VAL



Until largely replaced by JUDY, VAL was the standard Navy dive bomber. In side view the fixed landing gear and the fairing from the vertical fin to the fuselage are distinctive.



RESTRICTED

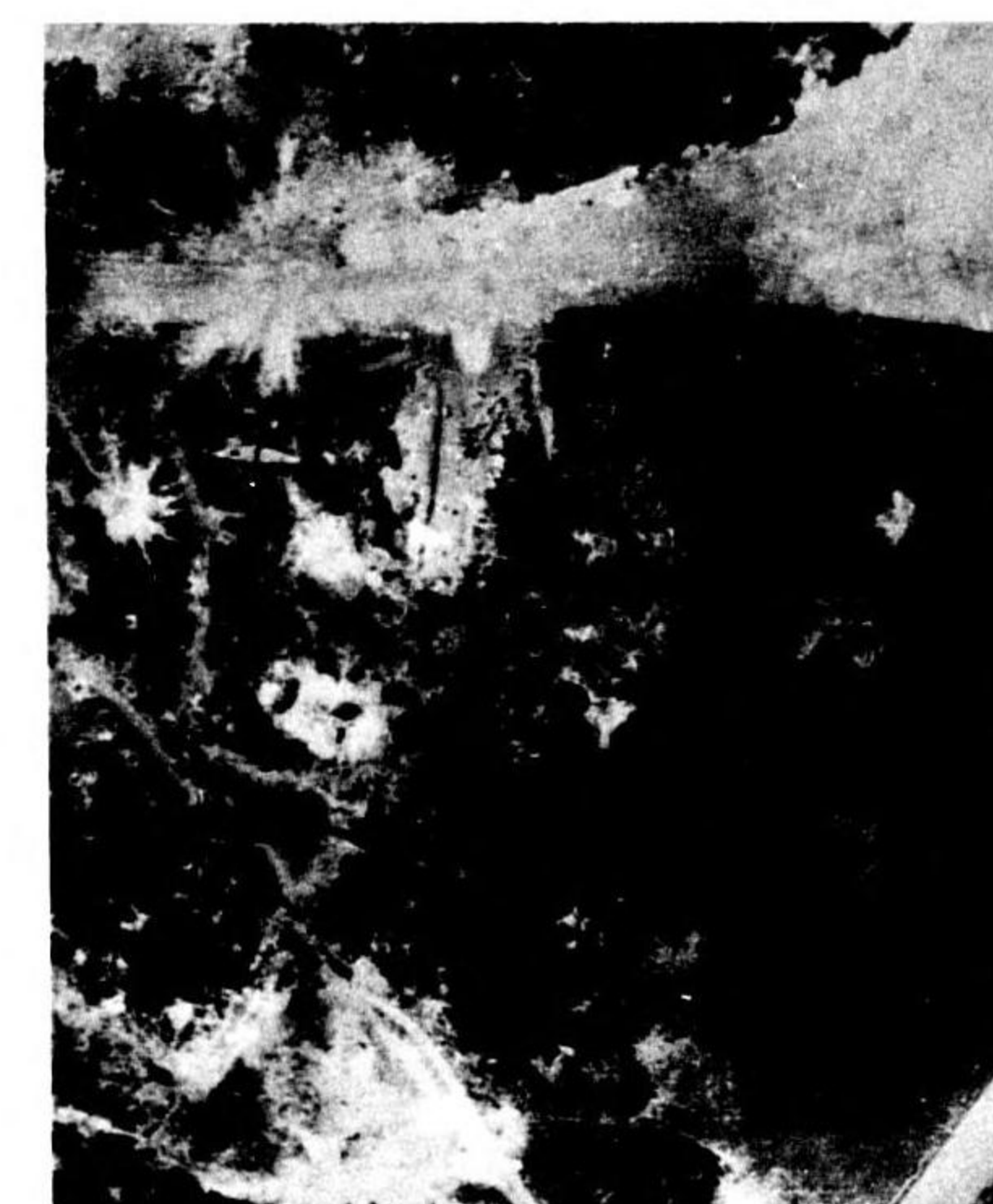
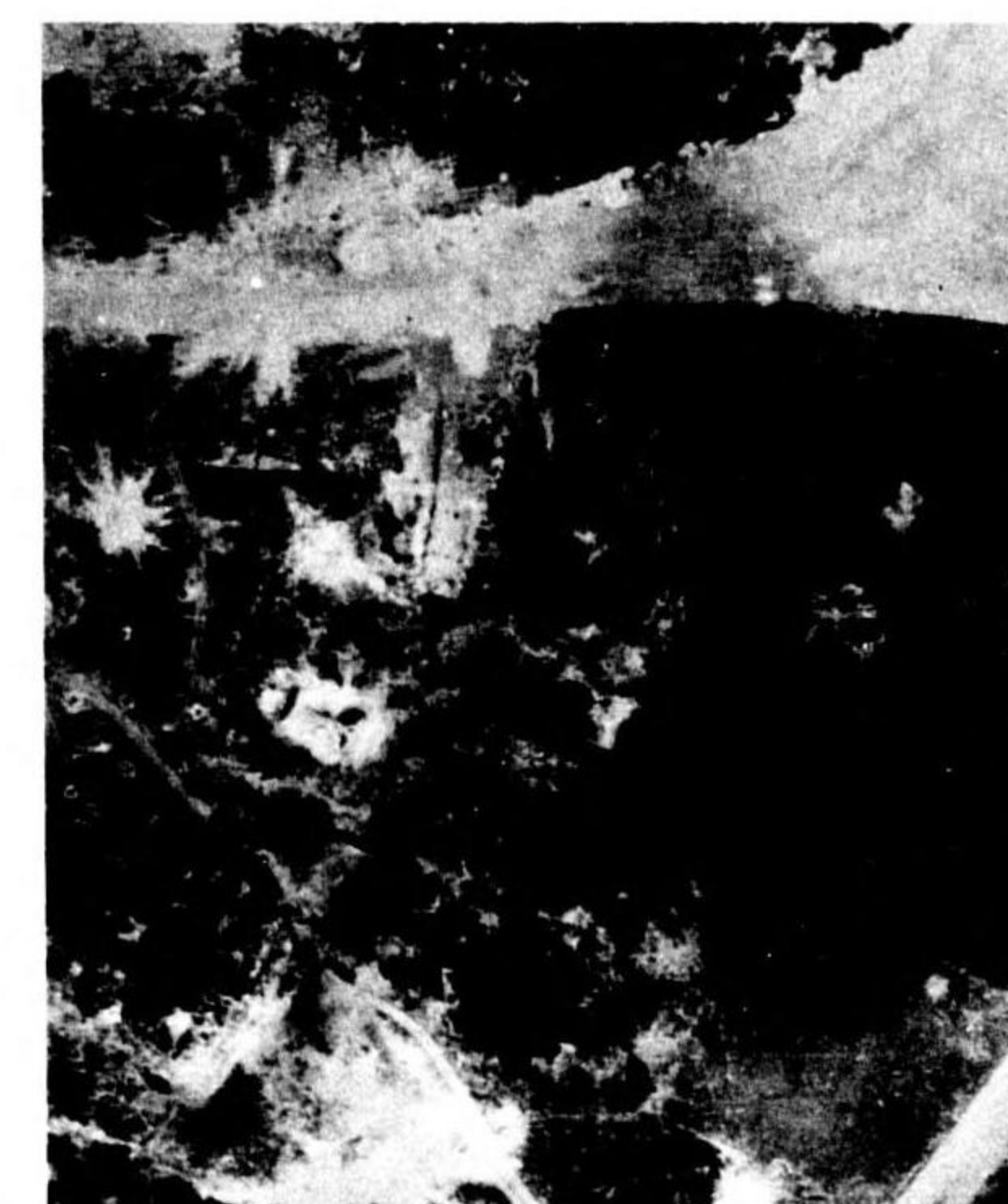


Photo Scale 1:4220

One VAL and one FRANCES with engines dismantled are shown above at Guam. The elliptical wing shape and slim tapering fuselage of VAL are its most important identification features.



Photo Scale 1:9745

Twenty-two VAL dive bombers are lined up at Mille above.

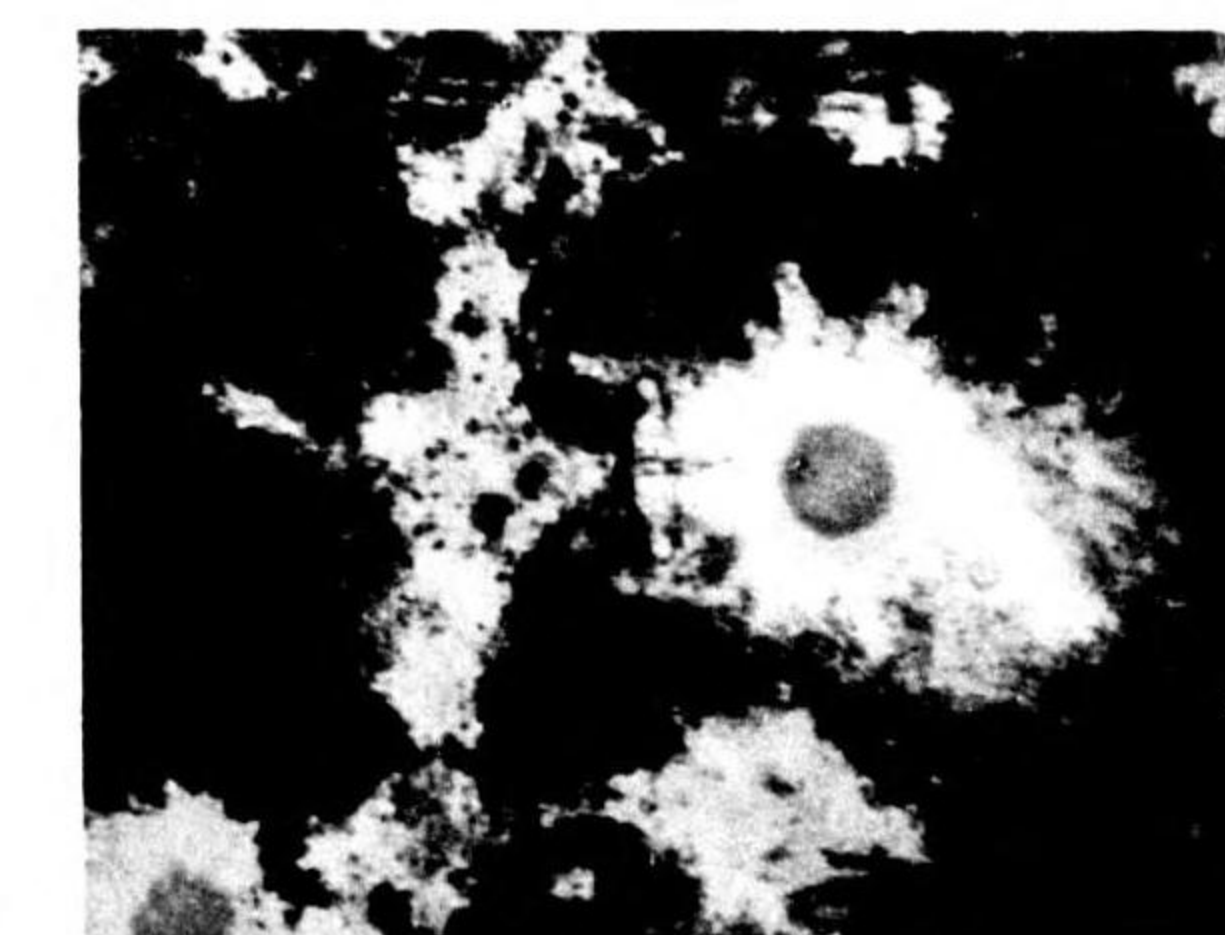
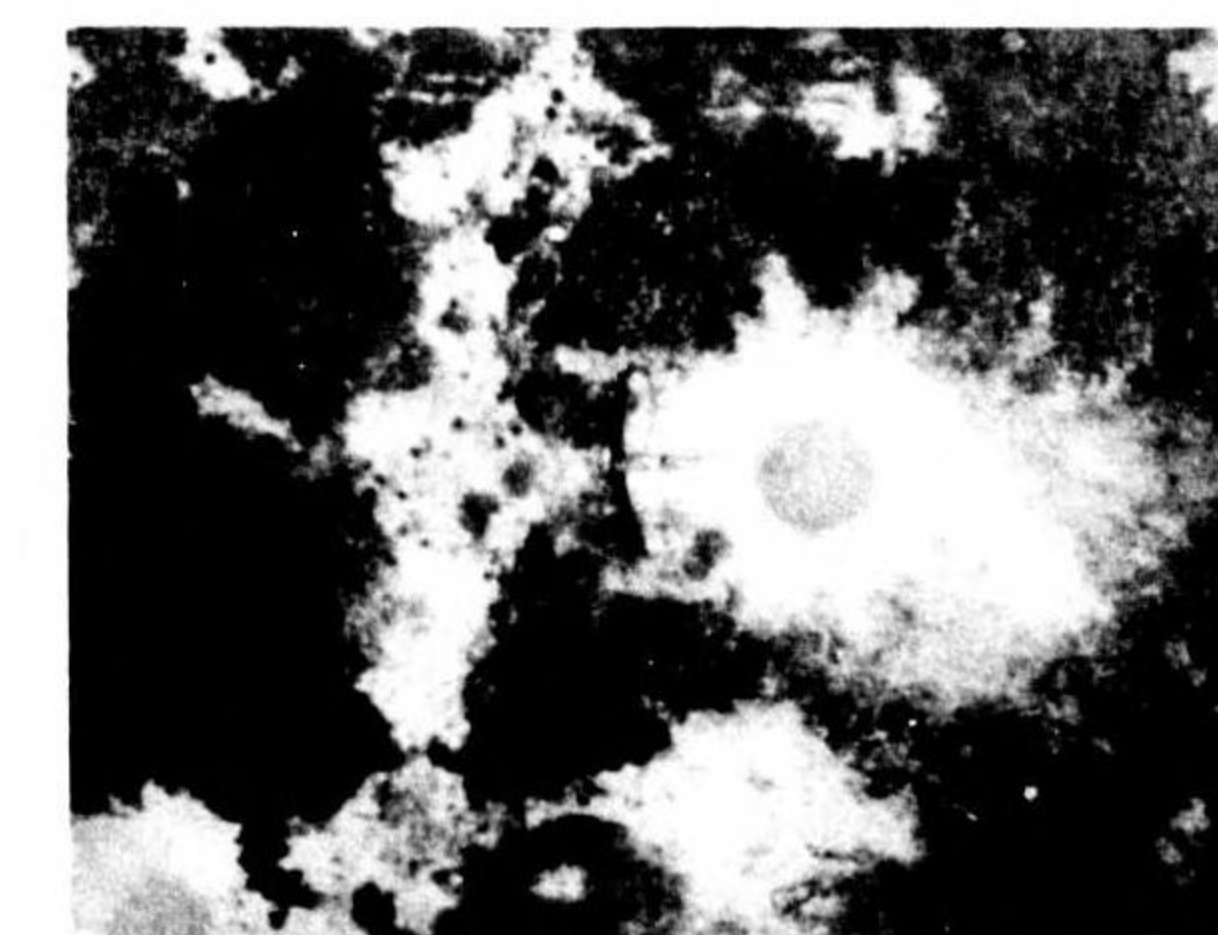


Photo Scale 1:1910

"MYRT"



Photo Scale



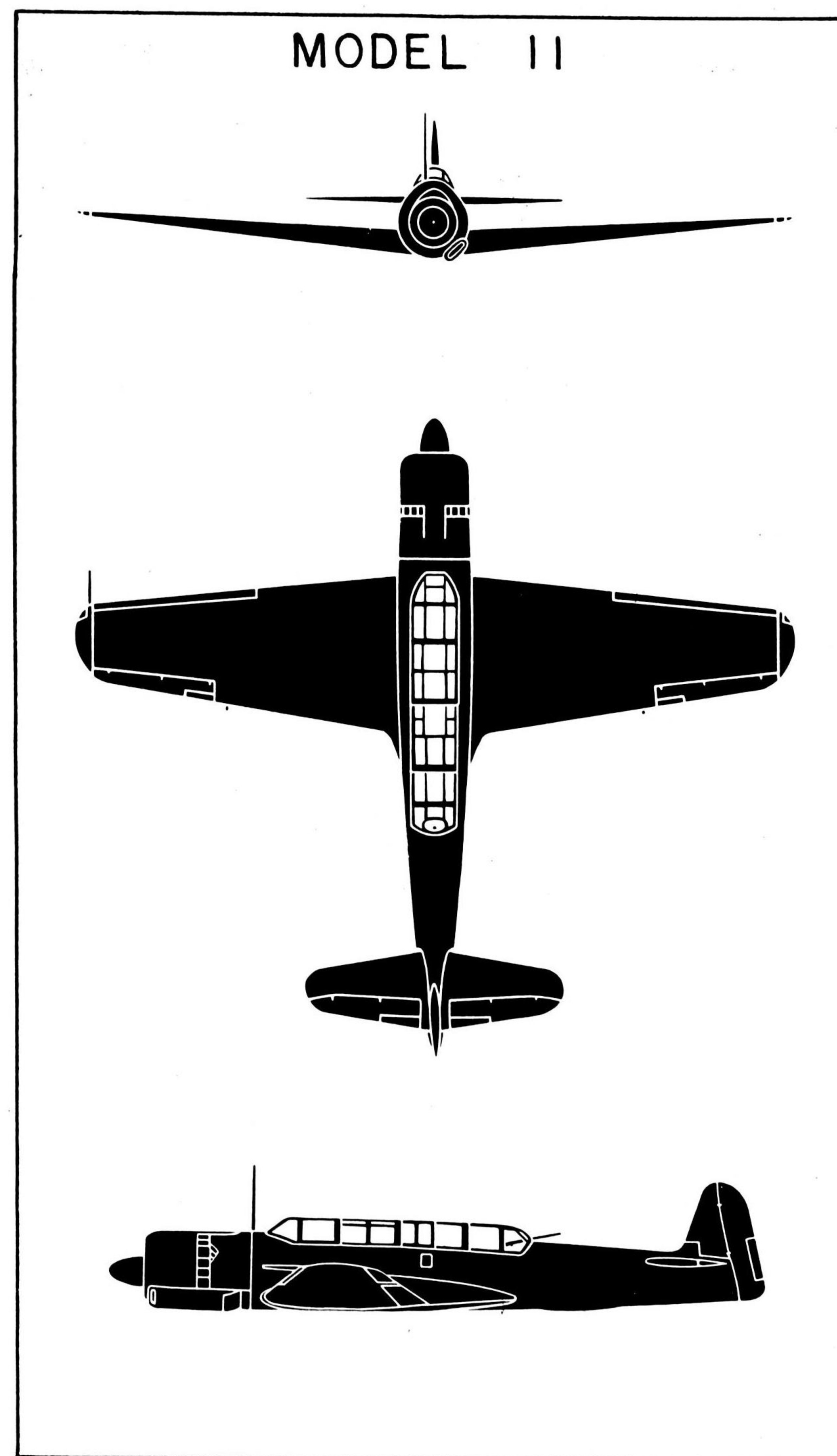
1:7470

Identification Data

- Wing has straight, even taper.
- Wing tips are blunt and rounded.
- Radial engine projects well forward of wing.
- Long greenhouse.
- Slim tailplane has slight taper on leading and trailing edges.
- Rudder projects slightly aft of tailplane.

MYRT is a carrier-borne reconnaissance plane which can also carry an external torpedo.

- NAKAJIMA
- RECONNAISSANCE
- S - 41' 1"
- L - 36' 6"



RESTRICTED

- MITSUBISHI 99
- RECONNAISSANCE
- S - 39' 10"
- L - 30' 2"

"SONIA"

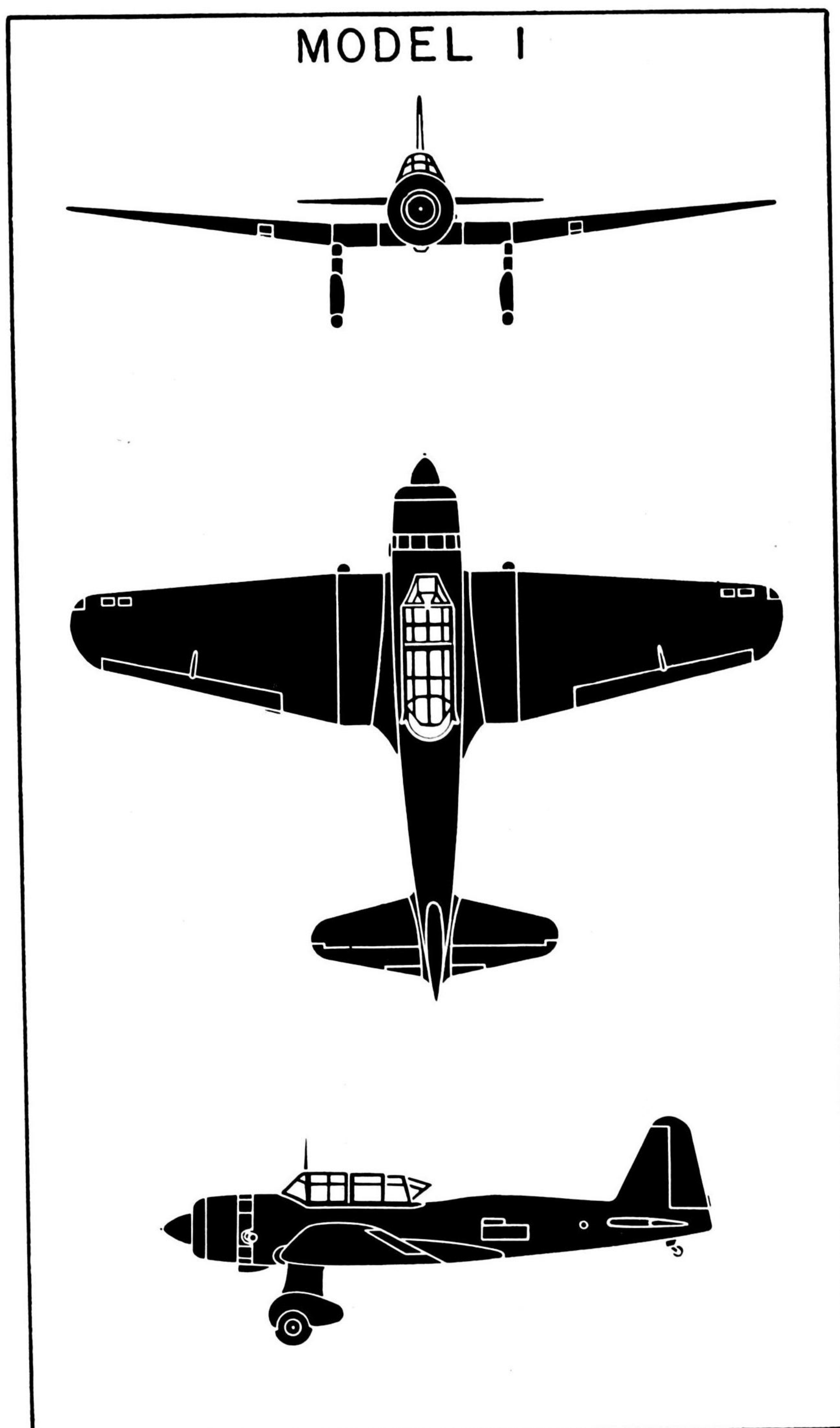


Photo Scale 1:2720

Identification Data

- Slight taper on leading edge of wing, sharp taper on trailing edge.
- Greenhouse extends length of wing root chord.
- Small tailplate has equal taper on leading and trailing edges.
- Tall vertical fin and rudder.
- Landing gear is non-retractable.

SONIA is also used as an assault plane and as a light bomber.

SONIA

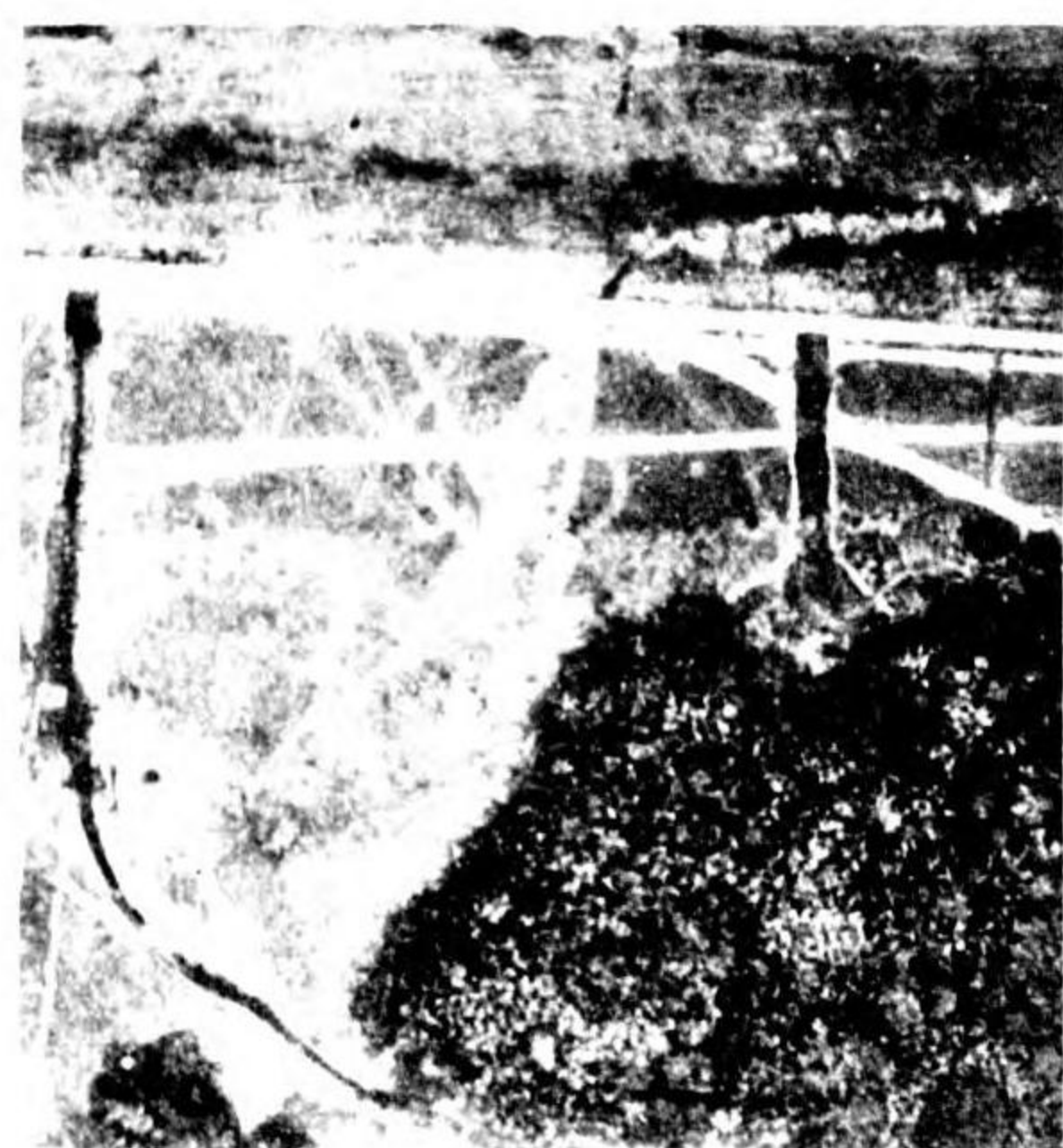


Photo Scale



1:5080



Photo Scale



1:2040

SONIA has a fat wing with a nearly straight leading edge and a sharp taper to the trailing edge. Also note the thick fuselage and the way the fat tailplane juts out nearly perpendicular to the fuselage.

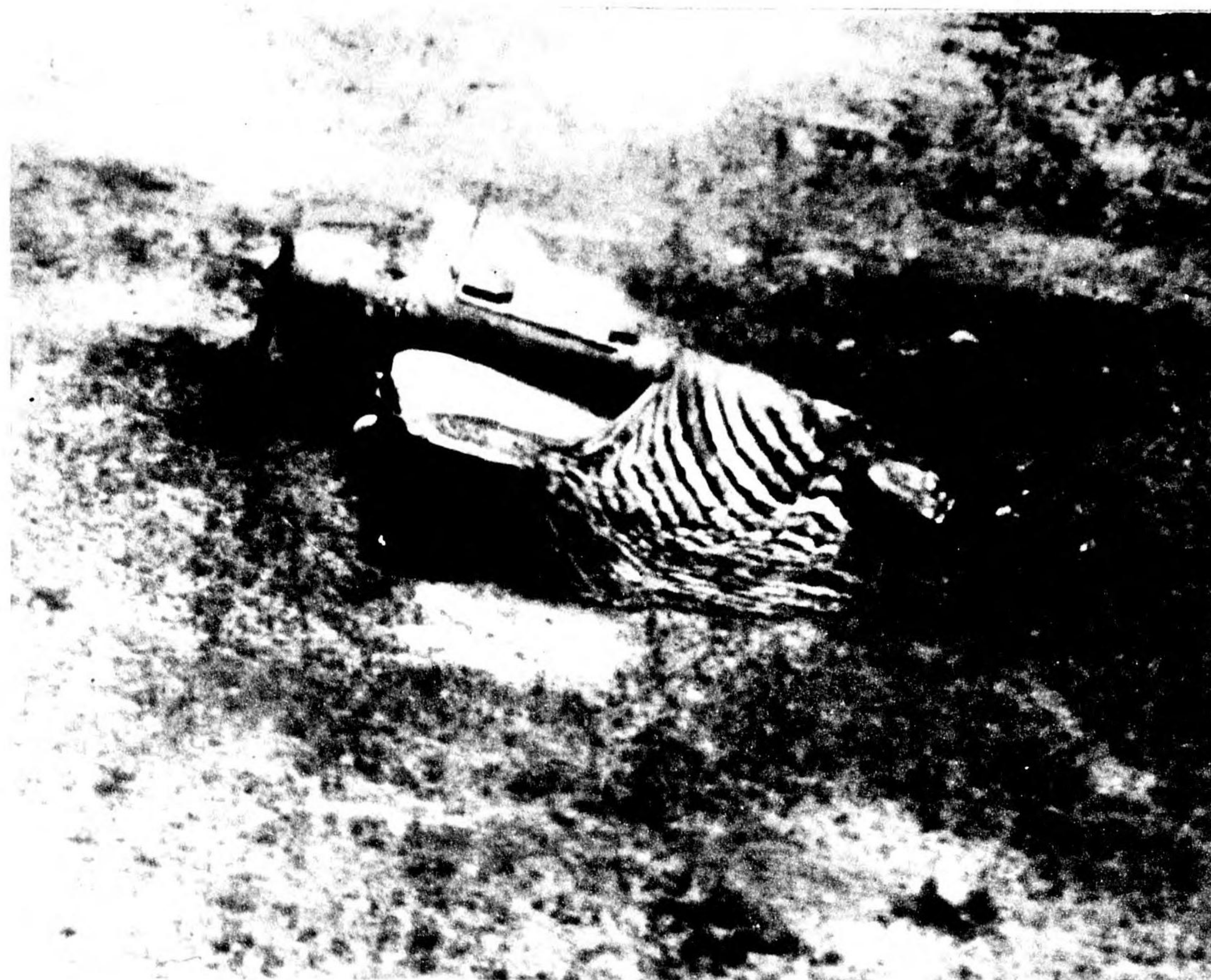
SONIA has a greenhouse extending only the length of the wing root chord. Many aircraft handbooks show a plane labeled SONIA which has a much longer greenhouse. This is actually an obsolete plane known as ANN which otherwise resembles SONIA in all views.



Photo Scale



1:3420



- MITSUBISHI 00
- FIGHTER
- S - 39' 3"
- L - 29' 9"

"ZEKE"

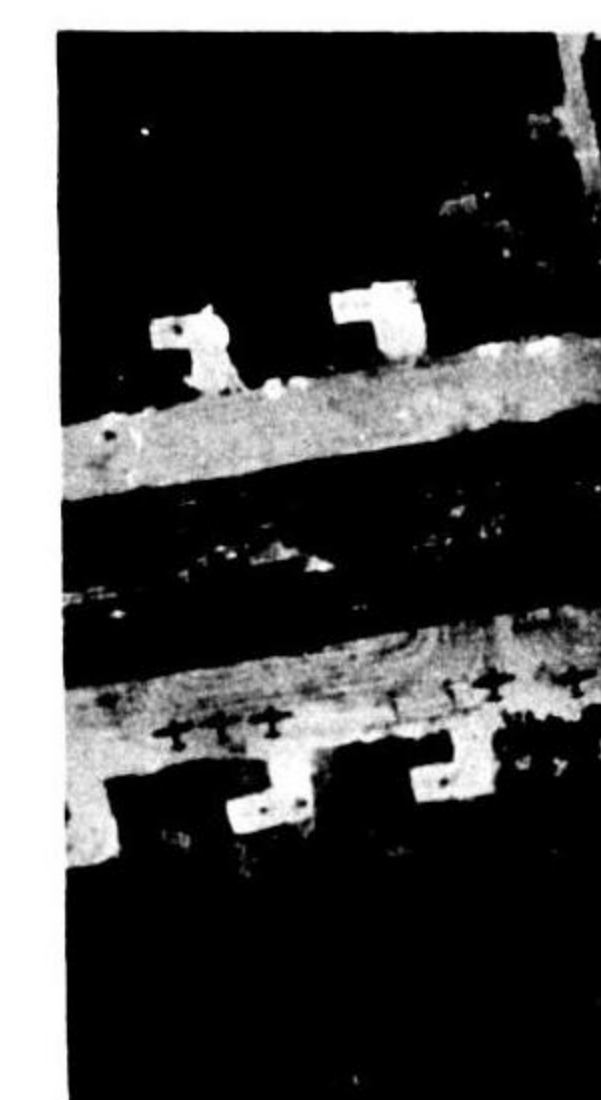
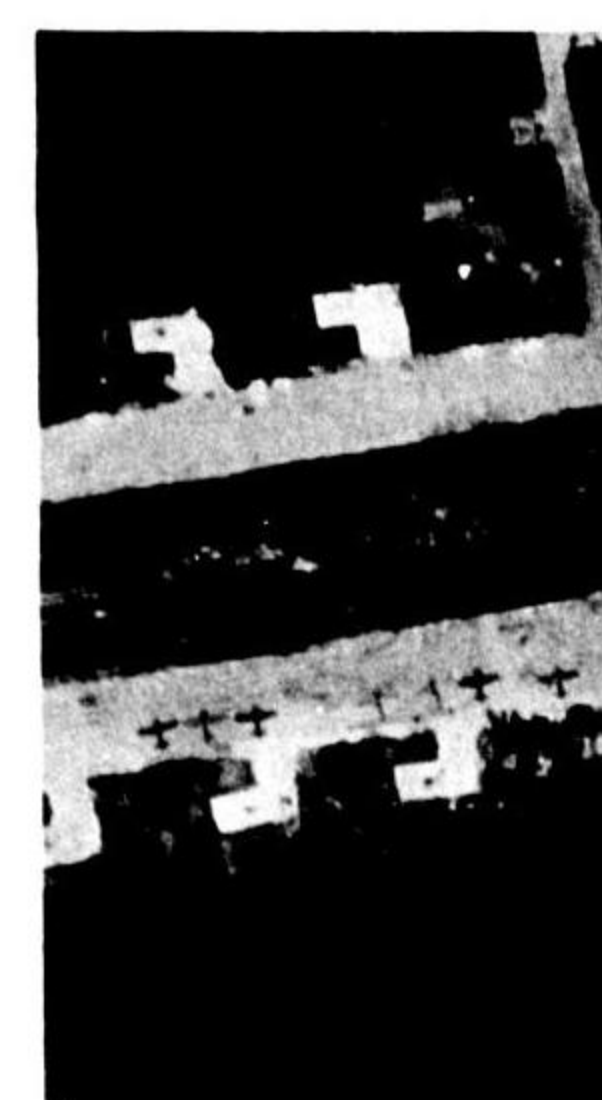
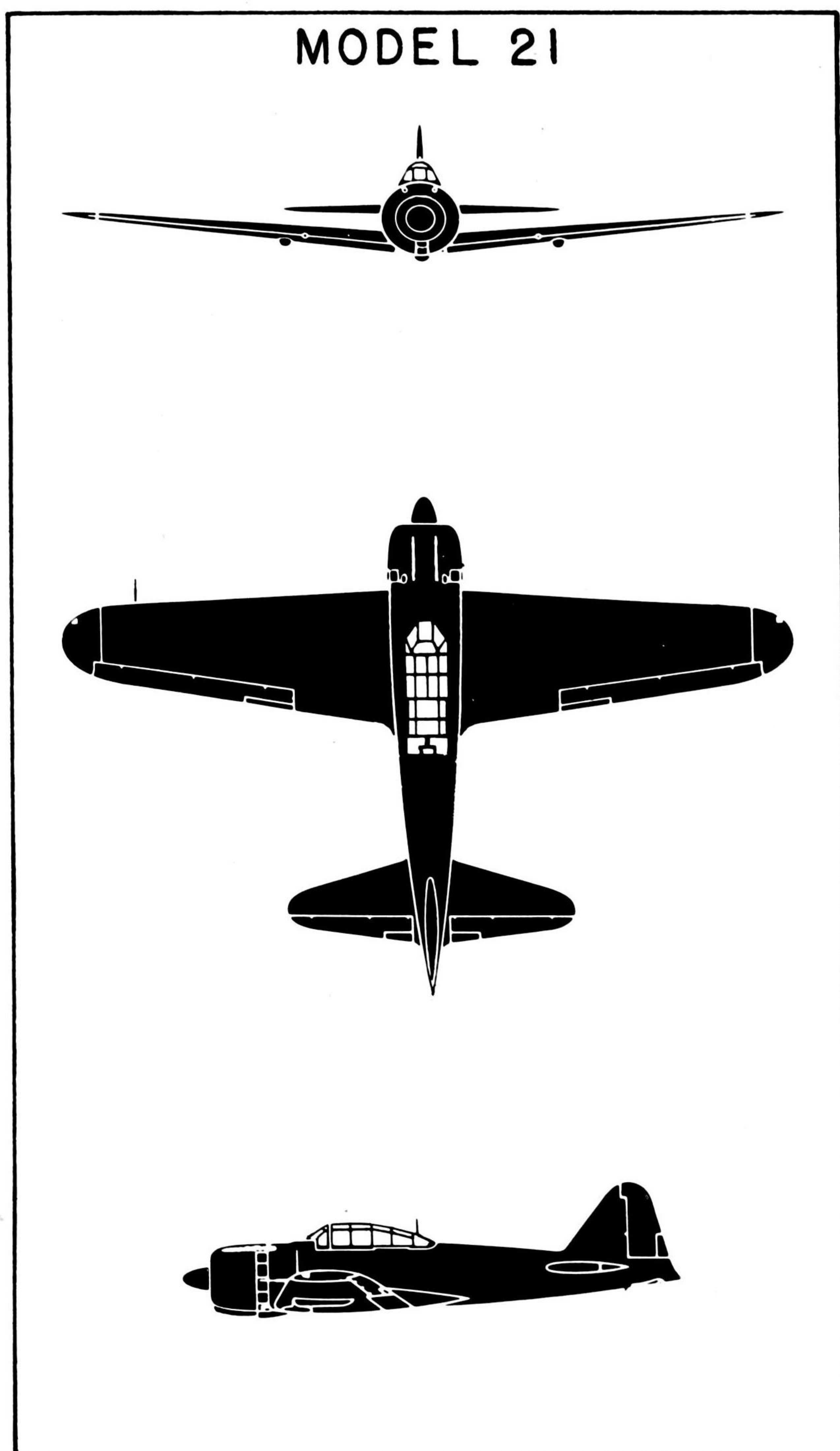


Photo Scale 1:5250

Identification Data

- Radial engine projects well forward of wing.
- Wing has even, moderate taper and rounded wing tips.
- Wing tips fold up about two feet from end.
- Vertical fin and rudder projects noticeably aft of tailplane.
- Oval fuselage tapers to a cone at rear.
- Leading edge of tailplane has sharp taper, trailing edge slight taper.
- High-set transparent cockpit.

ZEKE is also used as a light bomber.

ZEKE 21

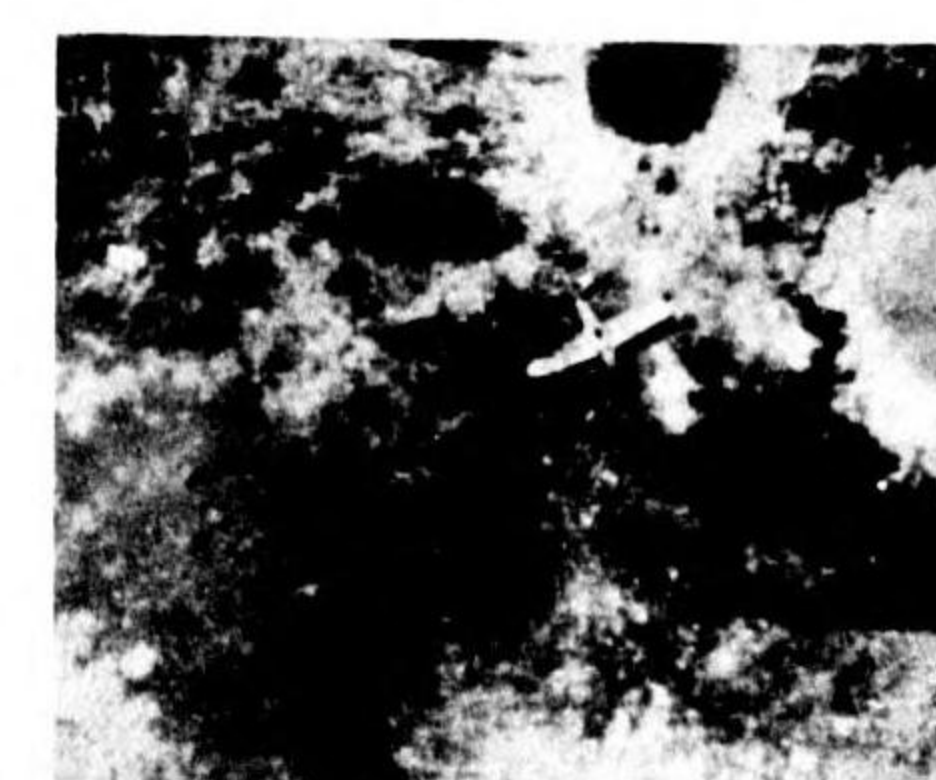
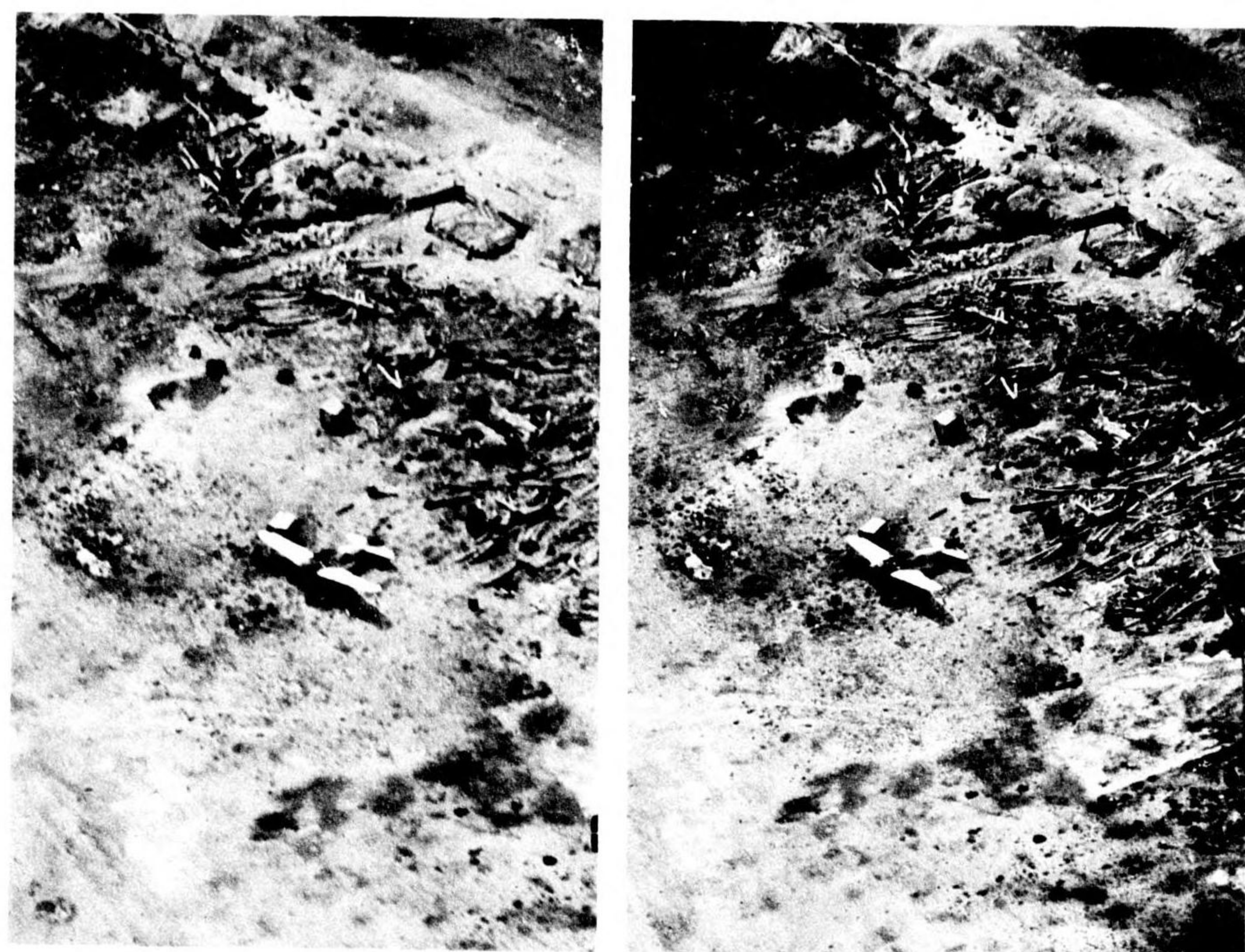


Photo Scale 1:1840

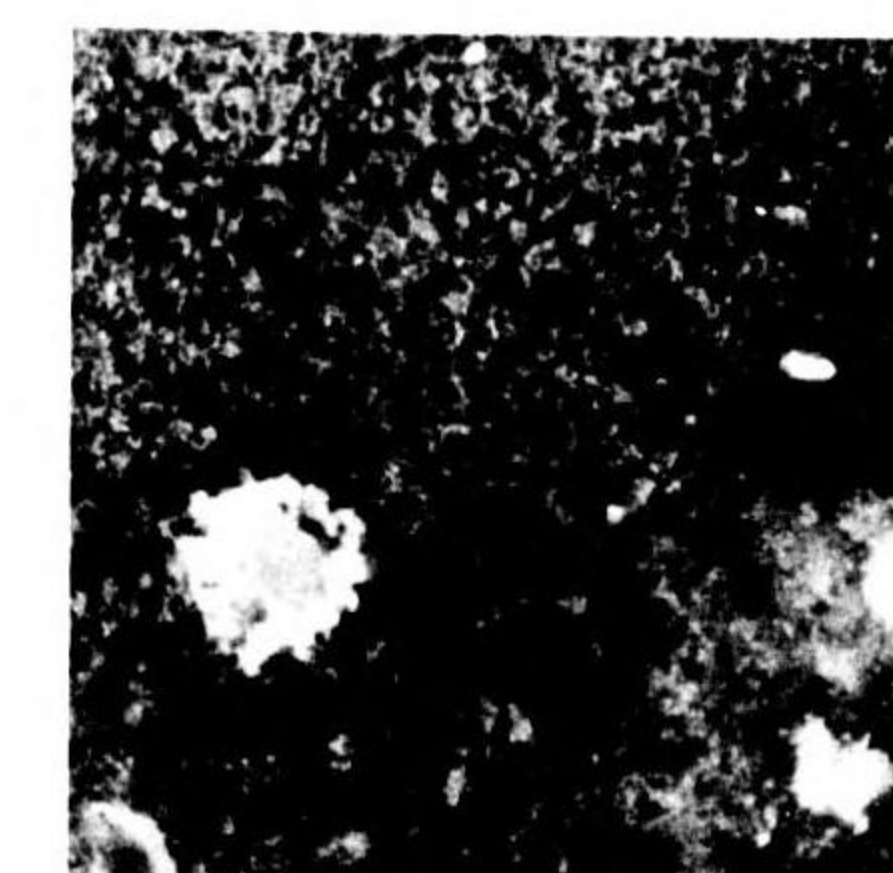
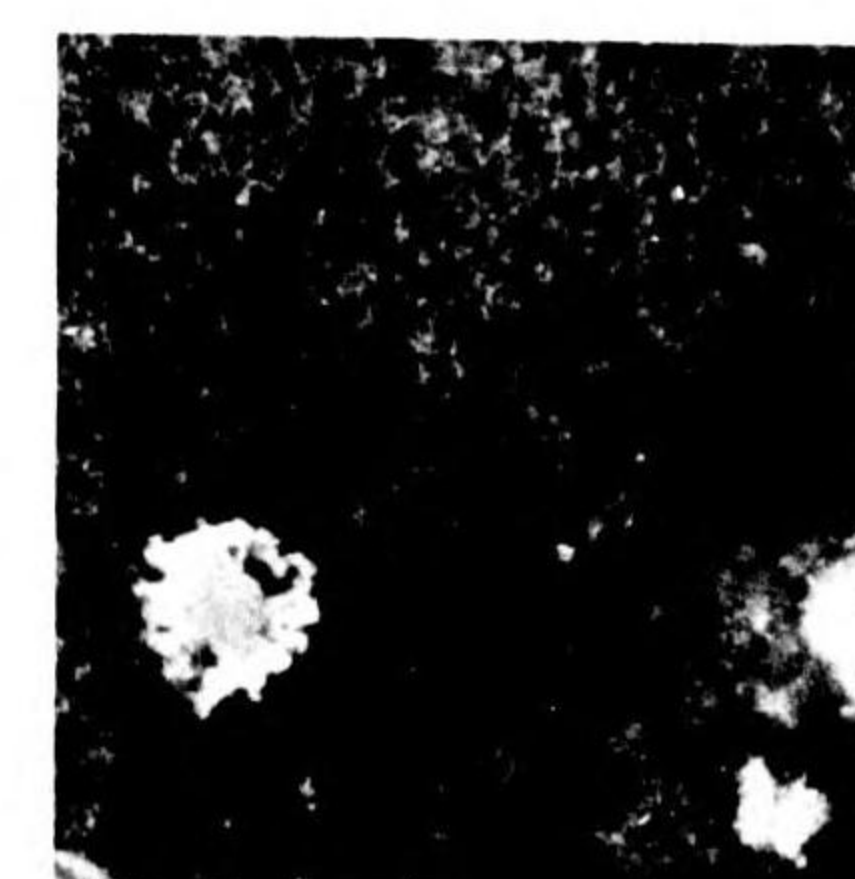


Photo Scale 1:1840

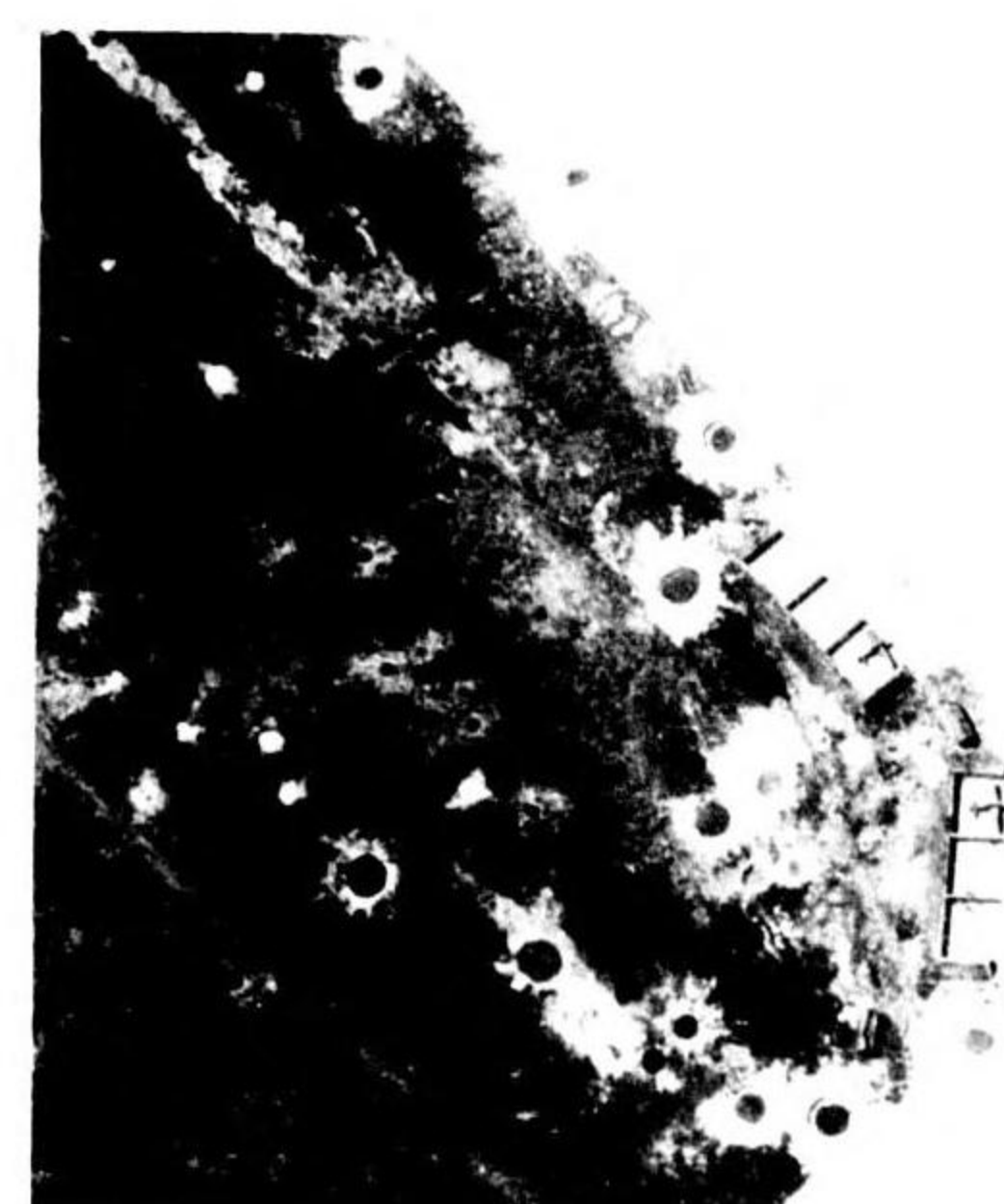


Photo Scale 1:5765



Three ZEKE's at Nauru. Note the folded wing tips and the raised cockpit.

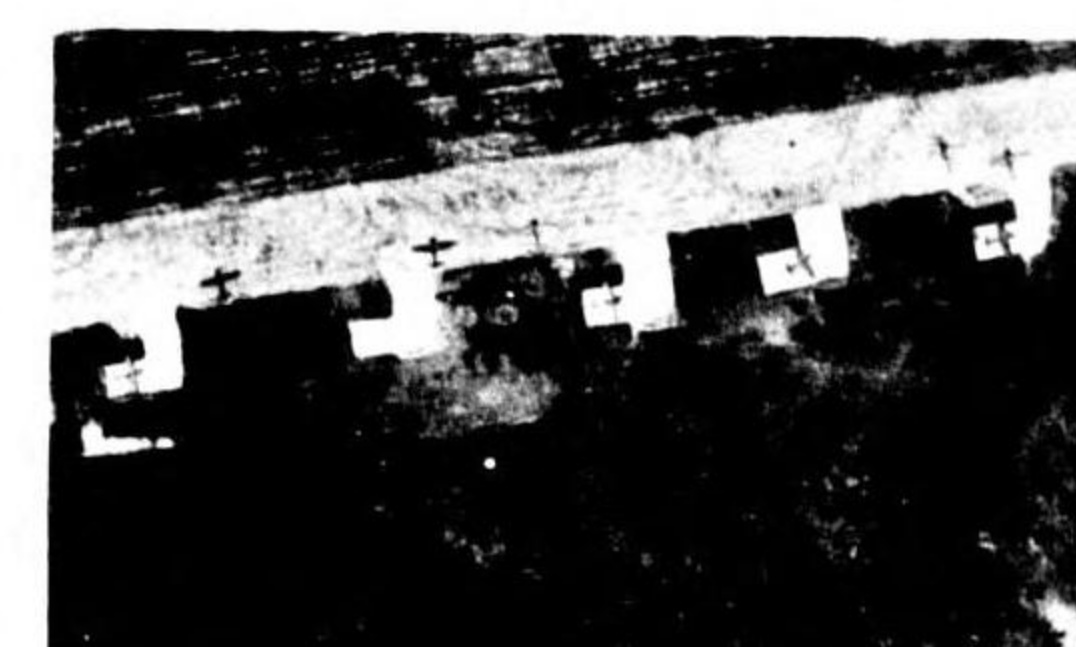


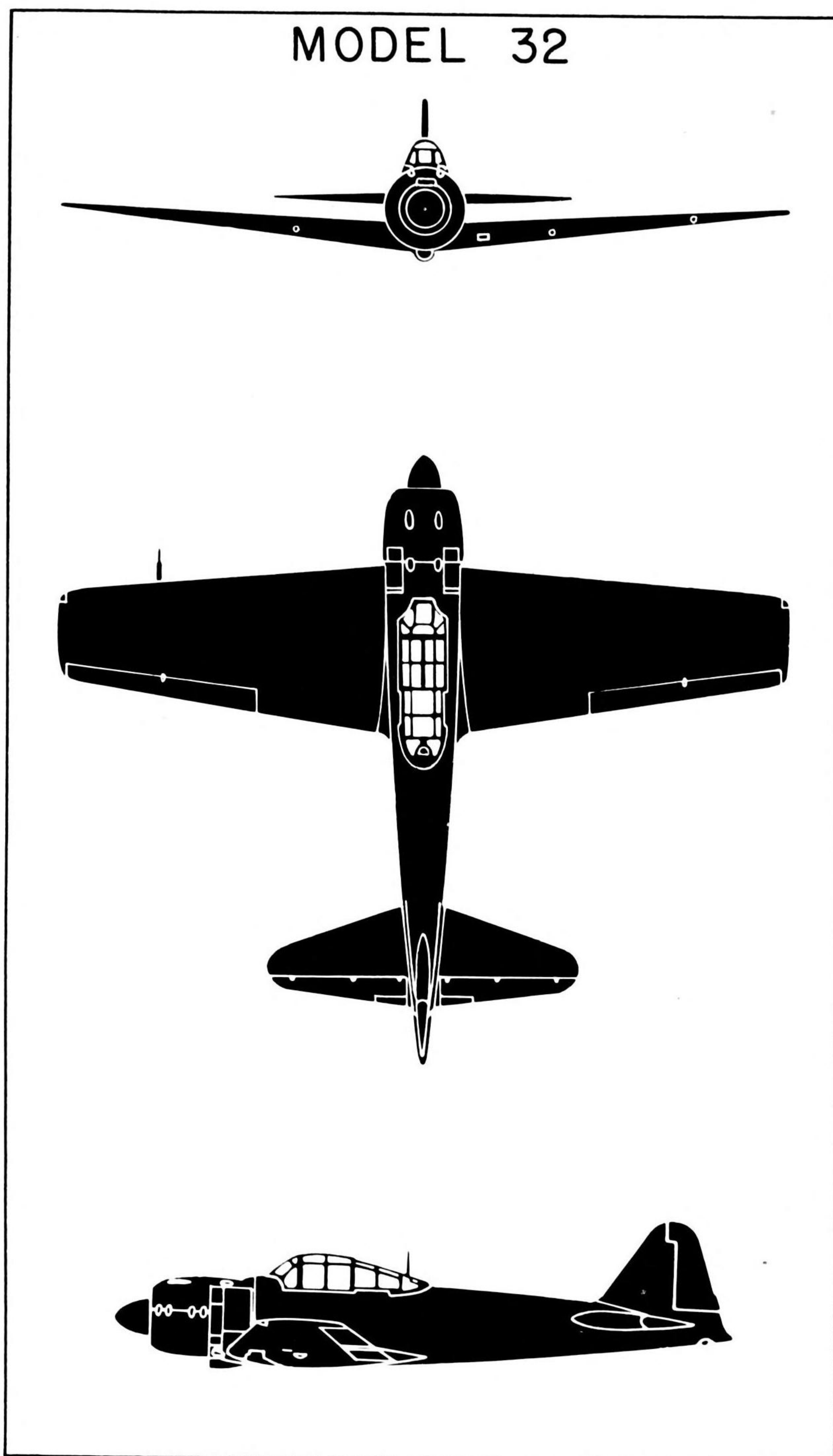
Photo Scale 1:6835

Note how the vertical fin and rudder projects aft of the tail plane. This is one of the first points to look for in identifying ZEKE.



Photo Scale 1:1815

Note the folded wing tips. At a smaller scale this plane could hardly be distinguished from the square-tipped ZEKE 32.



ZEKE, Model 32 is the plane formerly known as HAP and HAMP. It is no longer in production. ZEKE 32 with a span of 36' 2" and a length of 29' 9" has the same identification features as ZEKE 21 except for having a shortened wing span and squared wing tips.

ZEKE 21 with folded wing tips will be difficult to tell from ZEKE 32 on small scale vertical photos.

R E S T R I C T E D

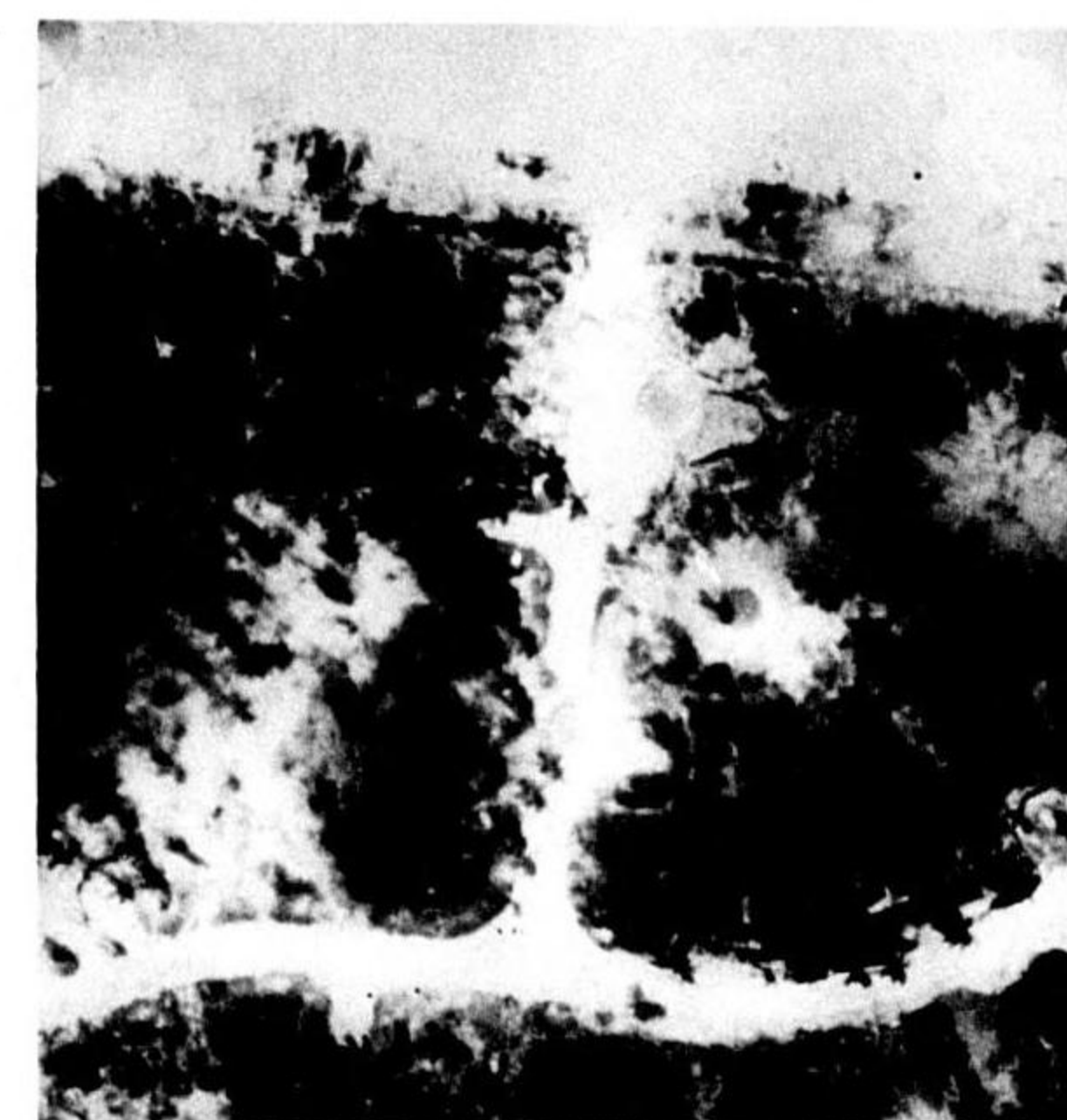


Photo Scale



1:4640

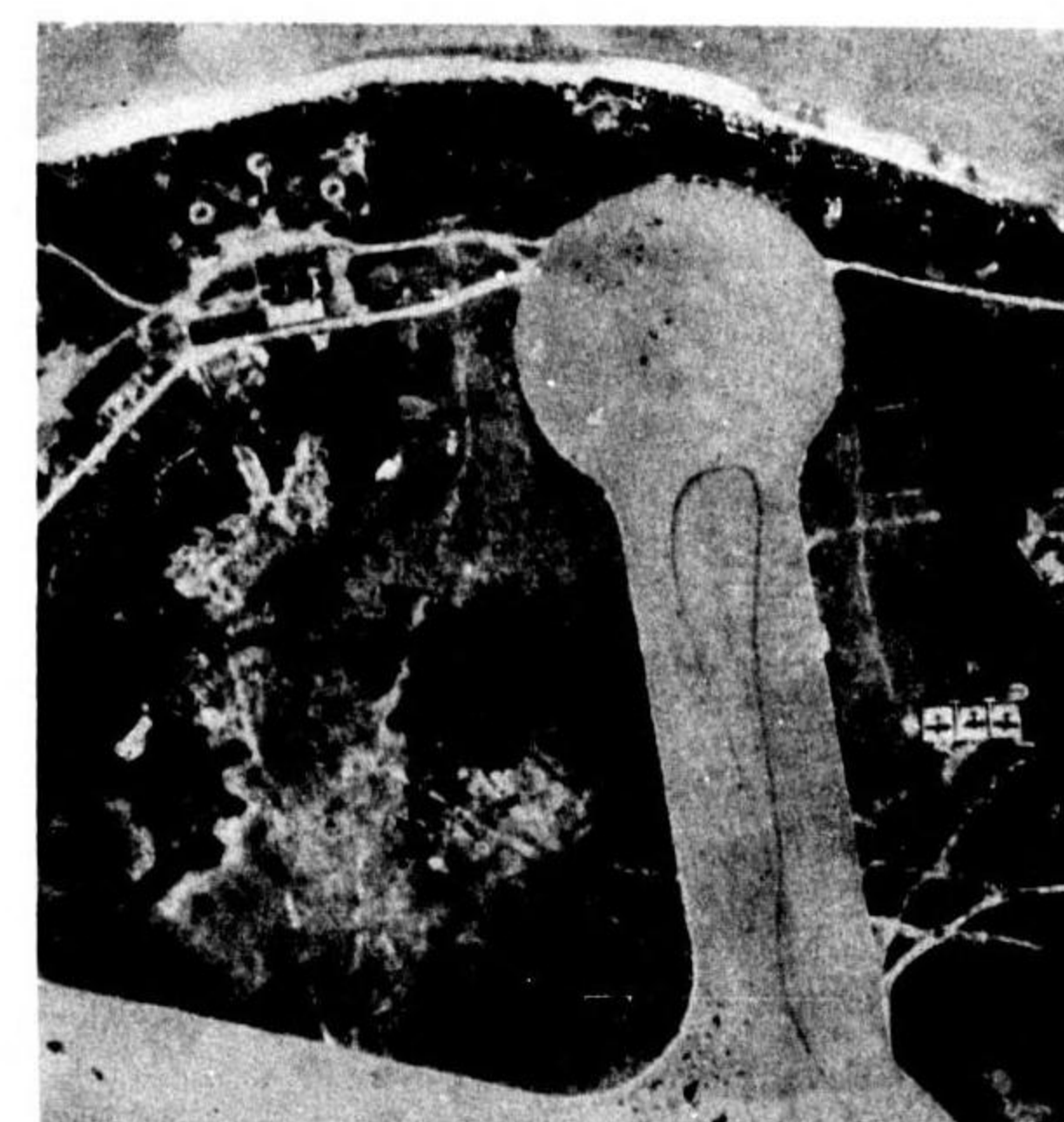


Photo Scale



1:9480

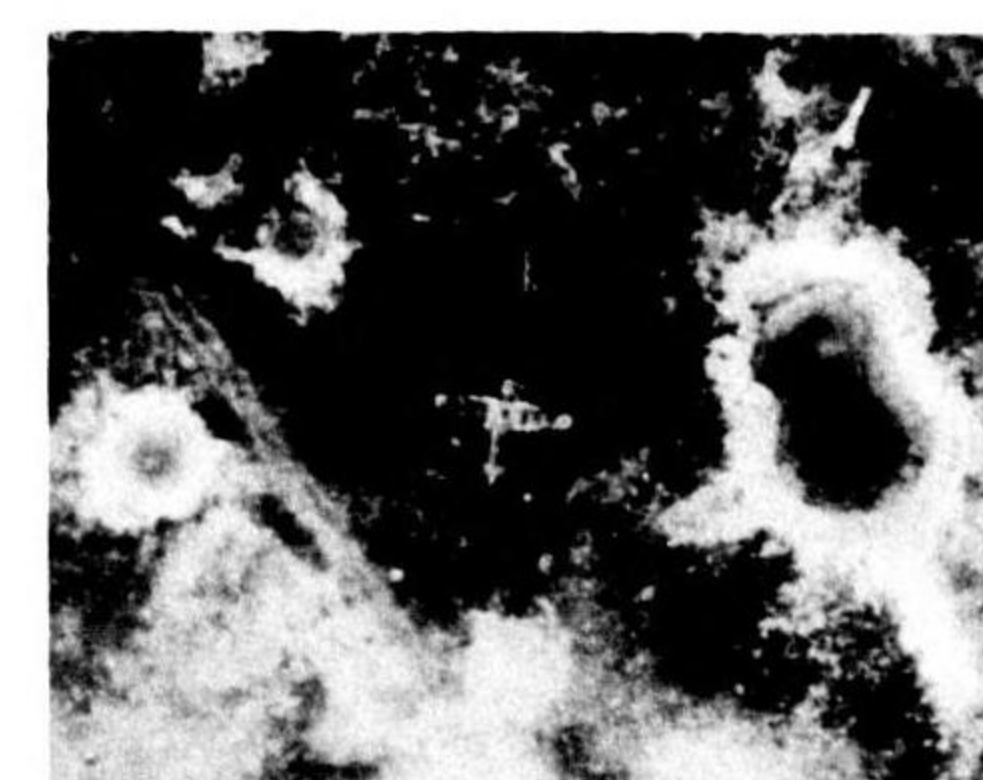
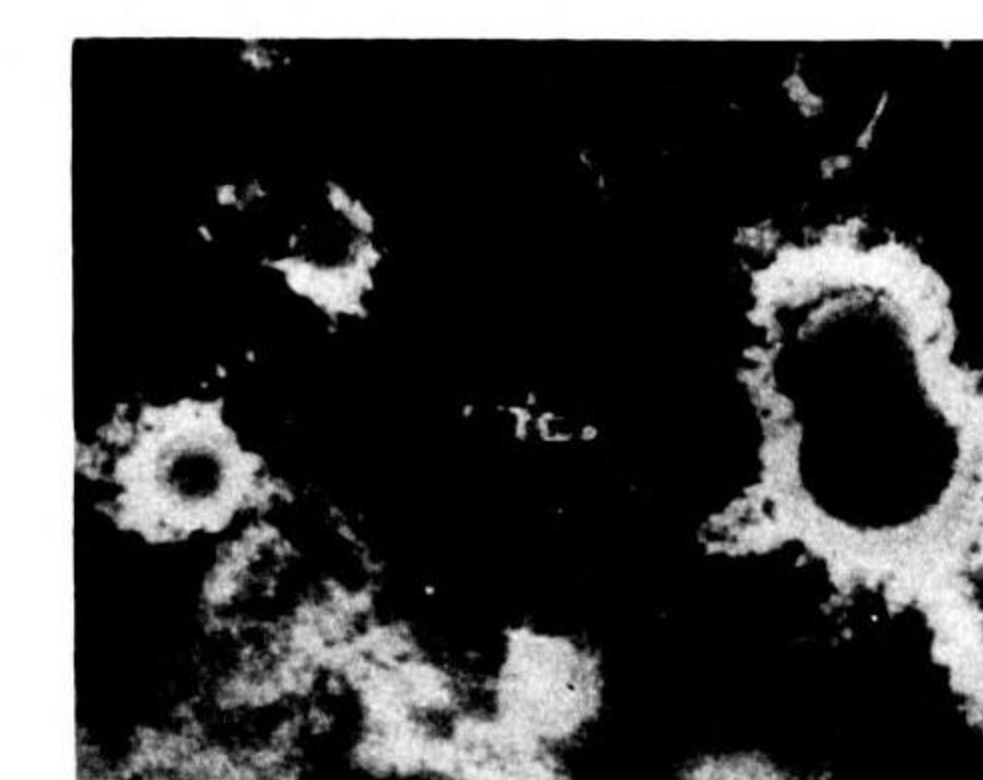


Photo Scale



1:1870



ZEKE 52



Photo Scale 1:5840

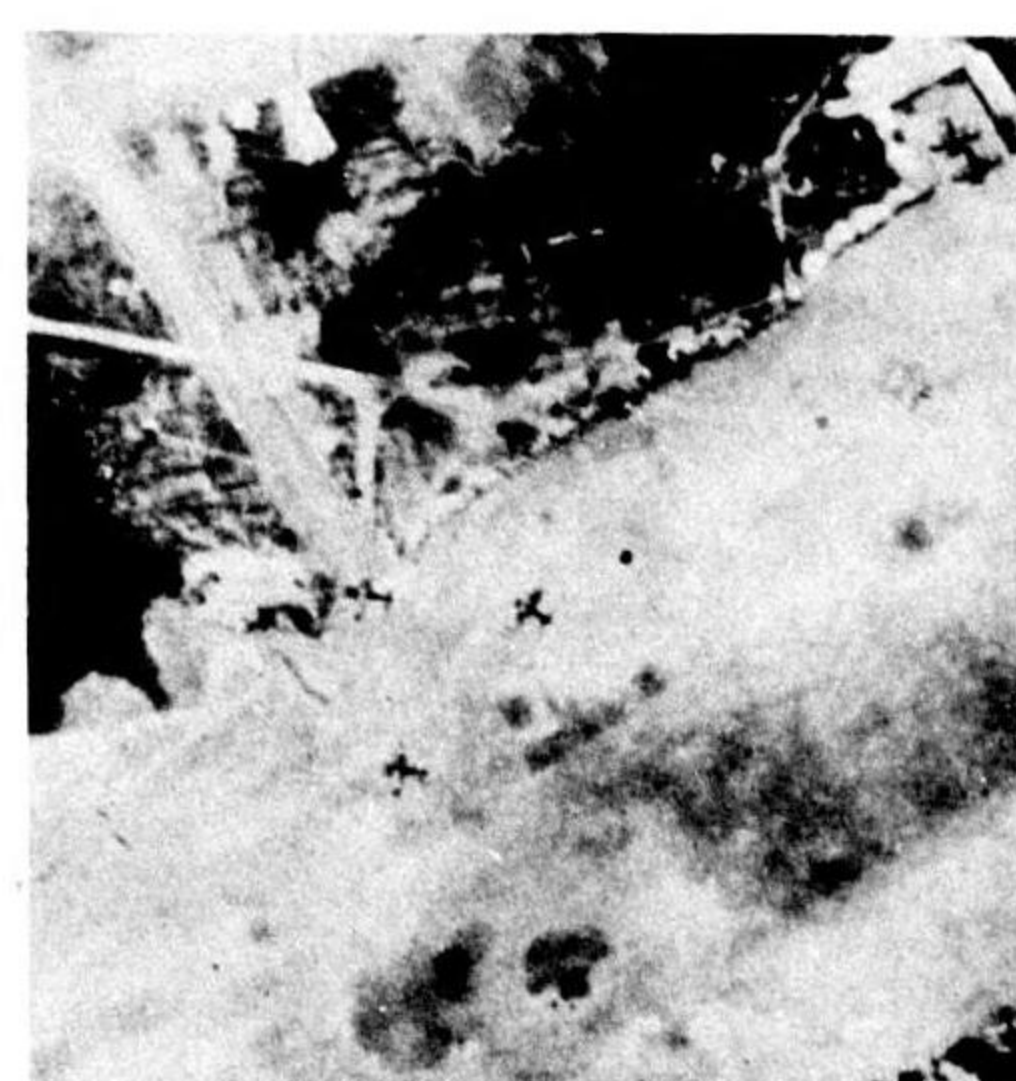
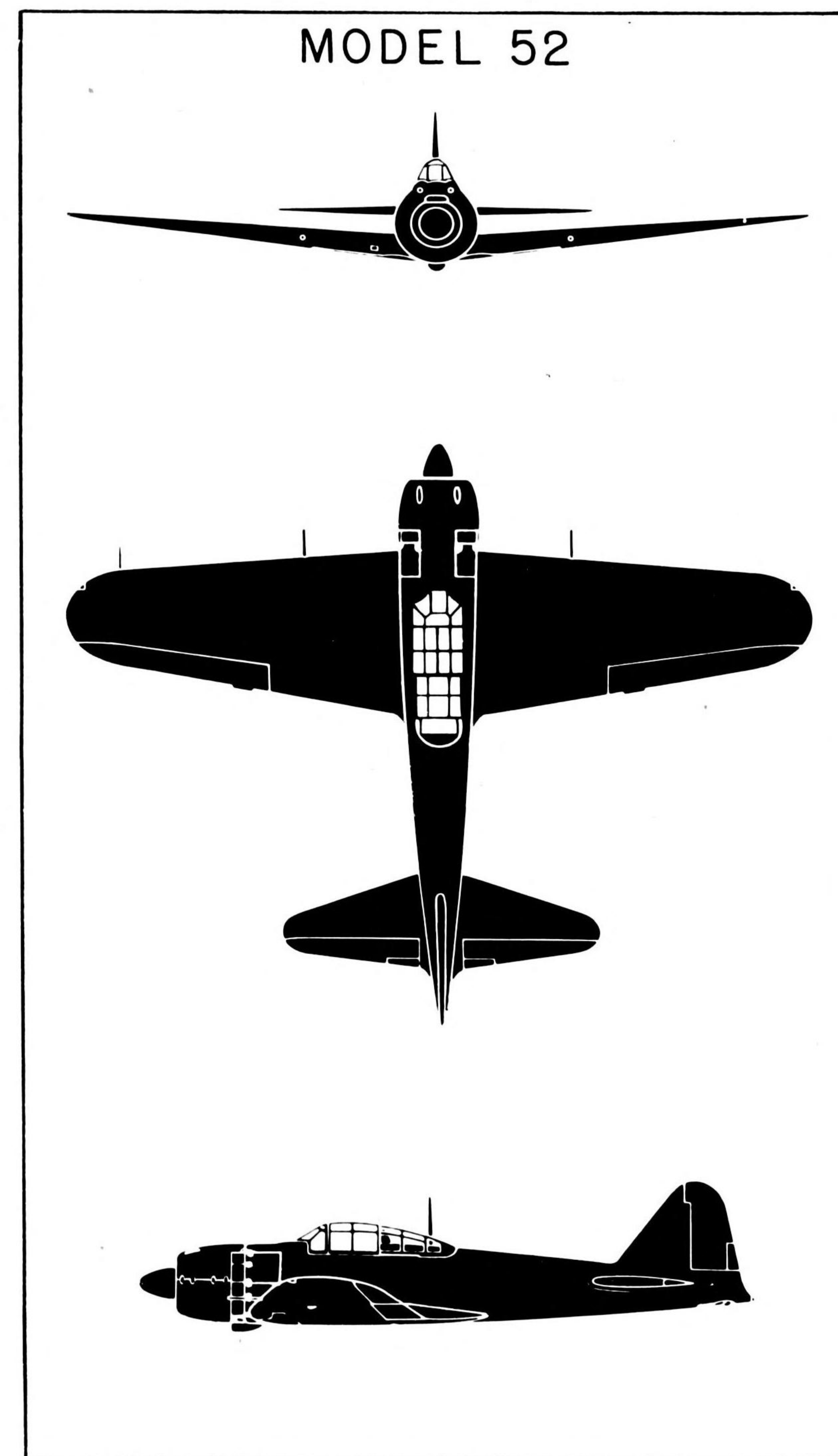
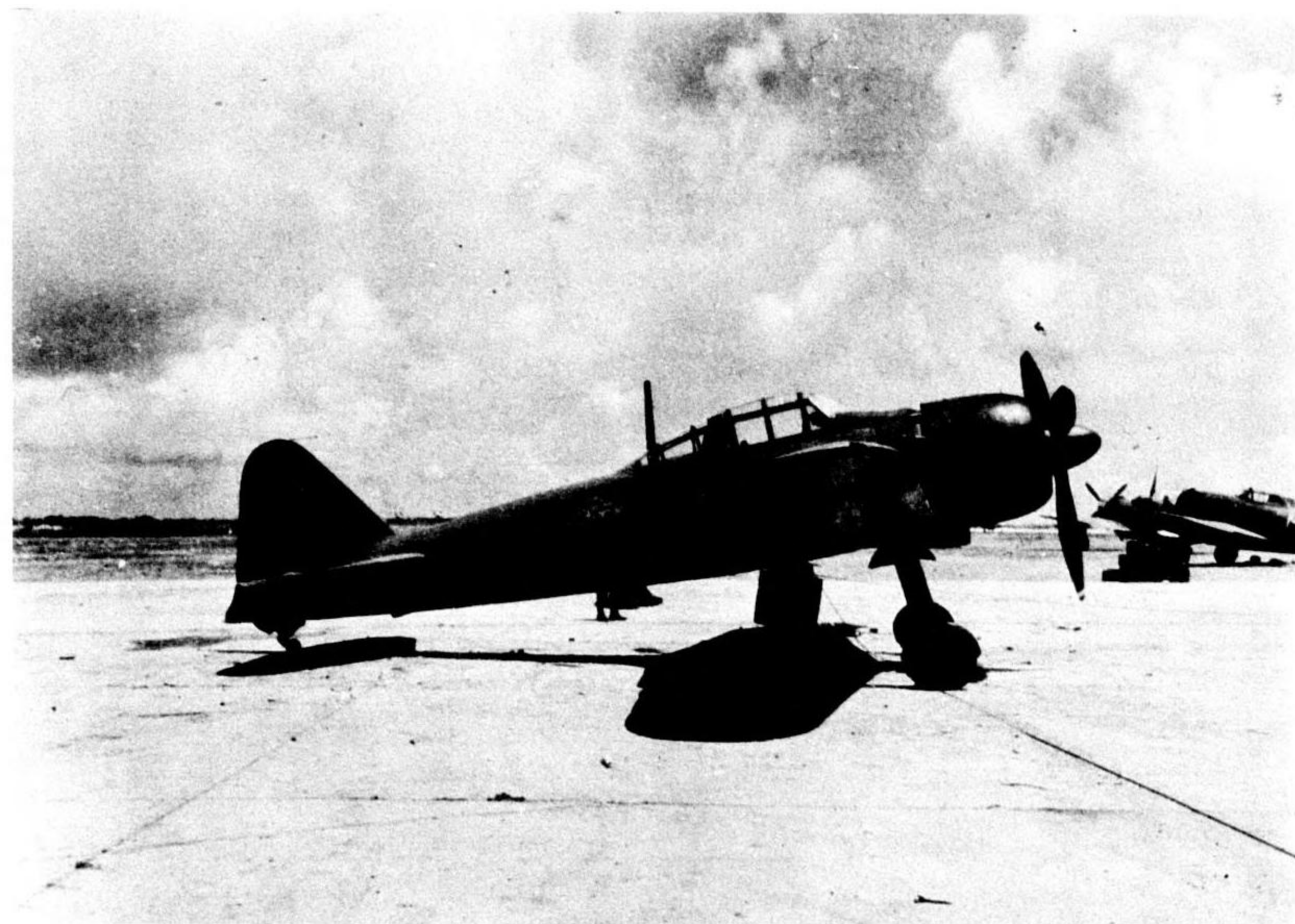


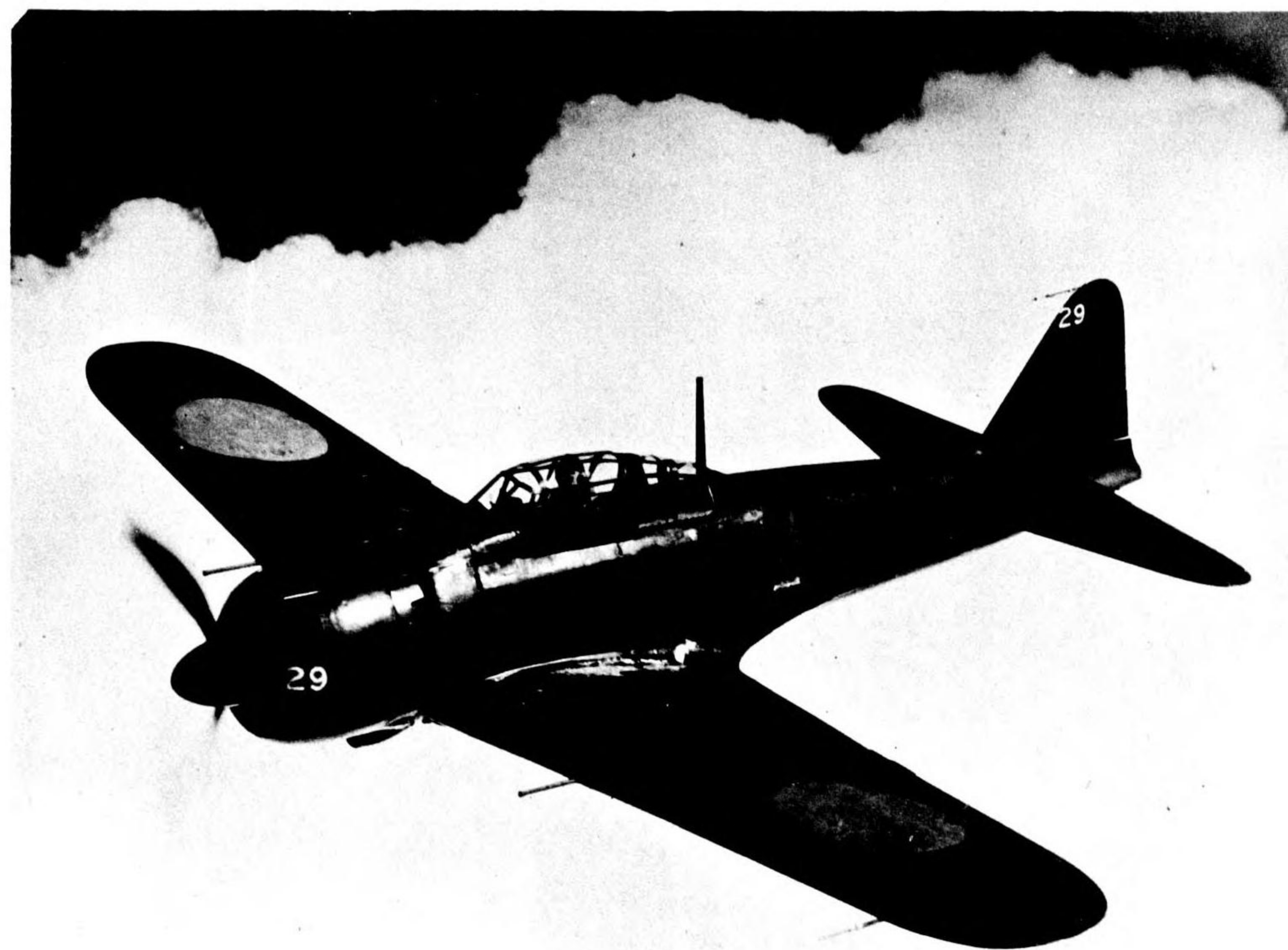
Photo Scale 1:5400

ZEKE 52 is identified by its evenly tapered stubby wing, its fat radial engine and by its projecting rudder.

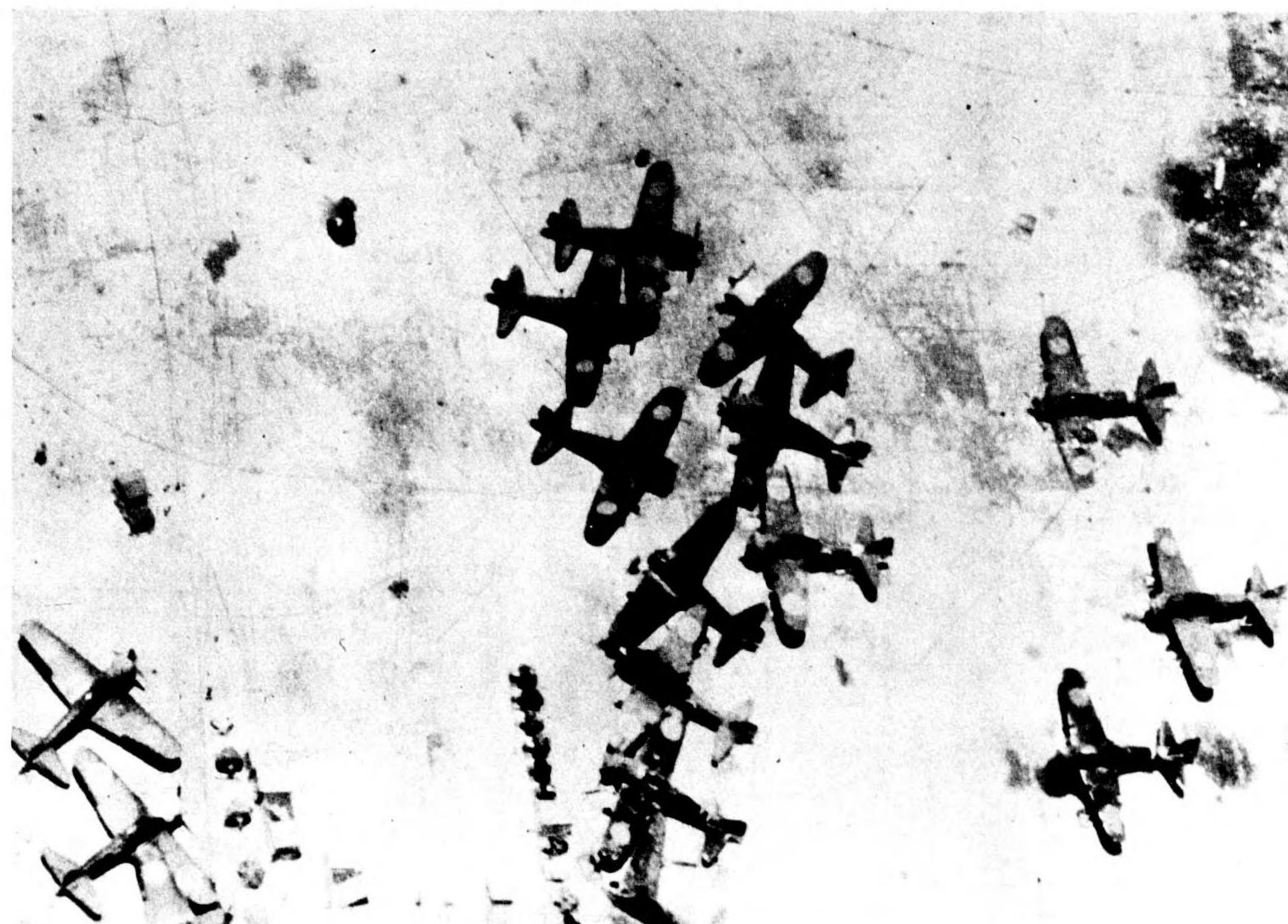


The silhouette above shows ZEKE 52, the only model of ZEKE still in production at the end of 1944. The only major difference from preceding models as far as identification is concerned is that a shorter wing span is combined with rounded tips. The span is 36' 2" and the length is 29' 9". ZEKE 52 is manufactured by Nakajima.

ZEKE is reportedly being completely replaced by SAM, a new carrier-based fighter.



It seems probable that the model number of this ZEKE will be changed in the near future. Captured planes have a different engine than that used in ZEKE 22 and ZEKE 32 and thus indicate that the title "52" is a temporary designation. The new model number probably will be 53 or 63.



RESTRICTED

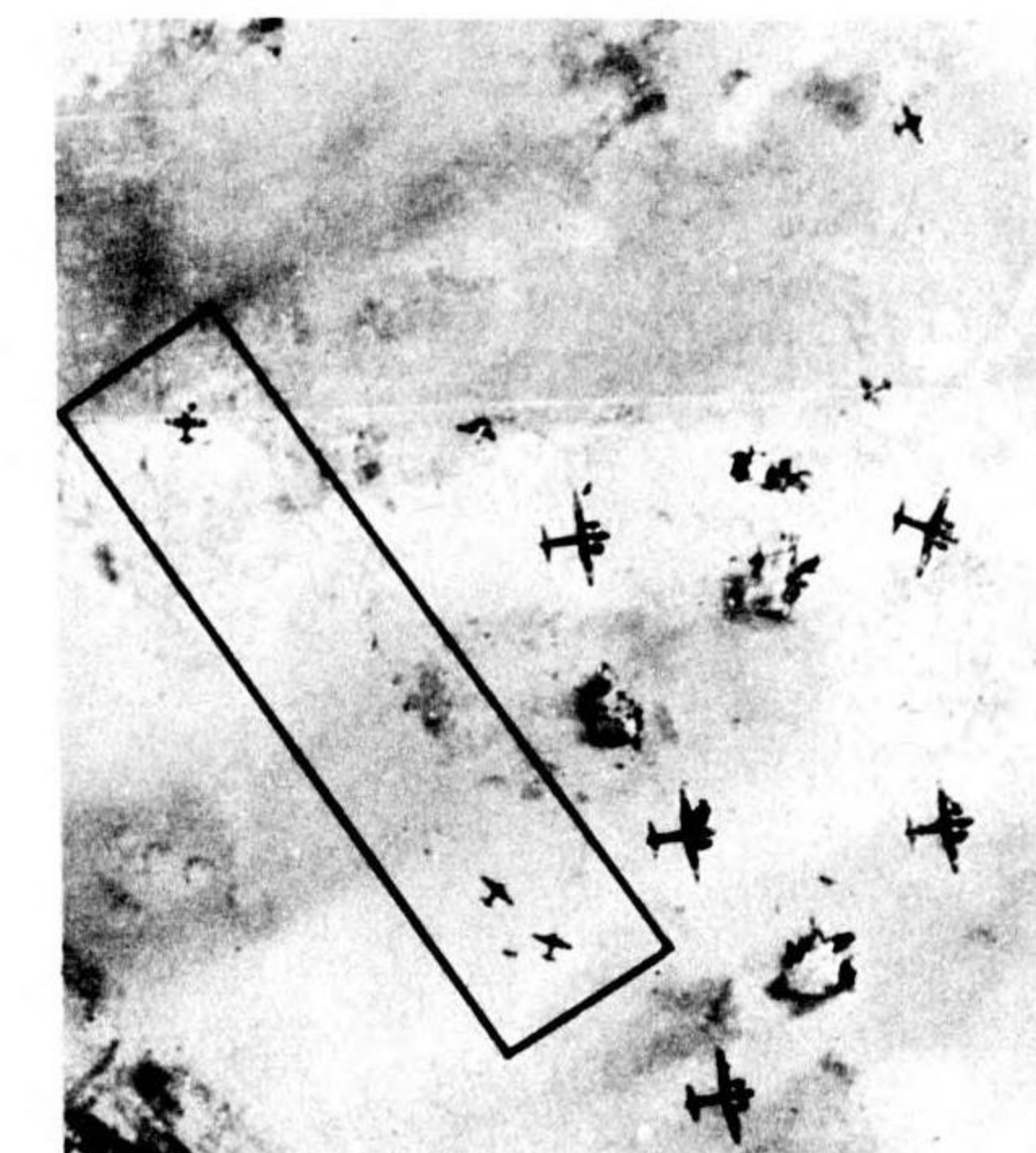


Photo Scale 1:5270

Shown above are three model 52 ZEKEs at Iwo Jima. Note the contrast of the stubby wing on these planes and the more elongated wing on the two model 21 ZEKEs shown in the upper right hand corner of the stereo. The rudder can be seen projecting aft of the tailplane on all the ZEKEs. Also note how the tendency of the Japanese to paint the leading edge of the wing white can easily create a false impression of the wing shape.

The twin-engine planes are model 22 BETTYs.



Photo Scale 1:6000

Two model 52 ZEKEs at Truk in the Carolines. The twin-engine plane at the left is IRVING. ZEKE 52 may easily be confused with the new Navy fighter known as JACK which is of similar size and shape. To distinguish between these two planes see page 3.24.

"TONY"

- KAWASAKI 03
- FIGHTER
- S - 39' 4"
- L - 28' 9"



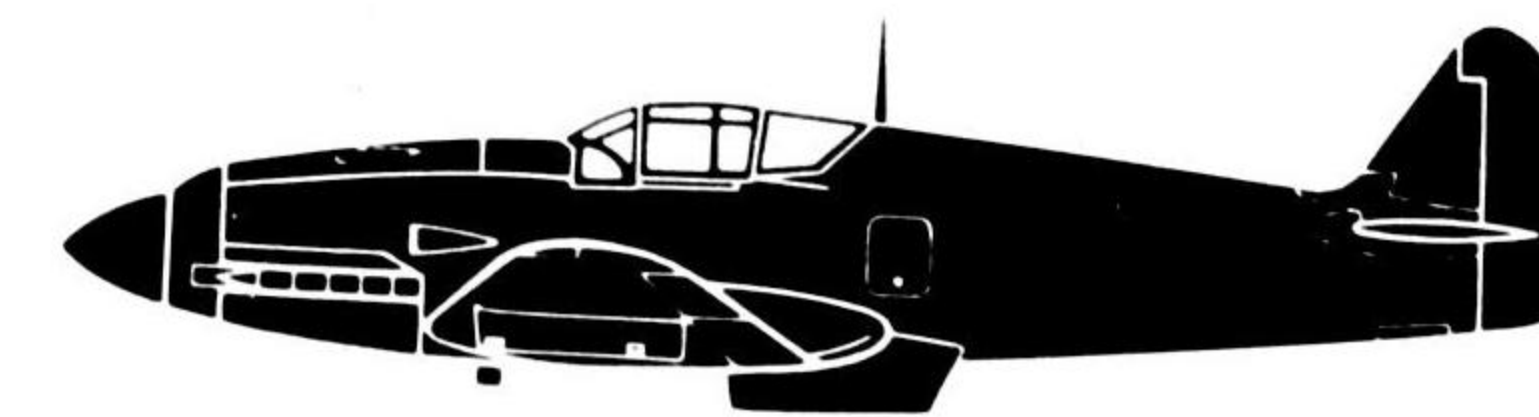
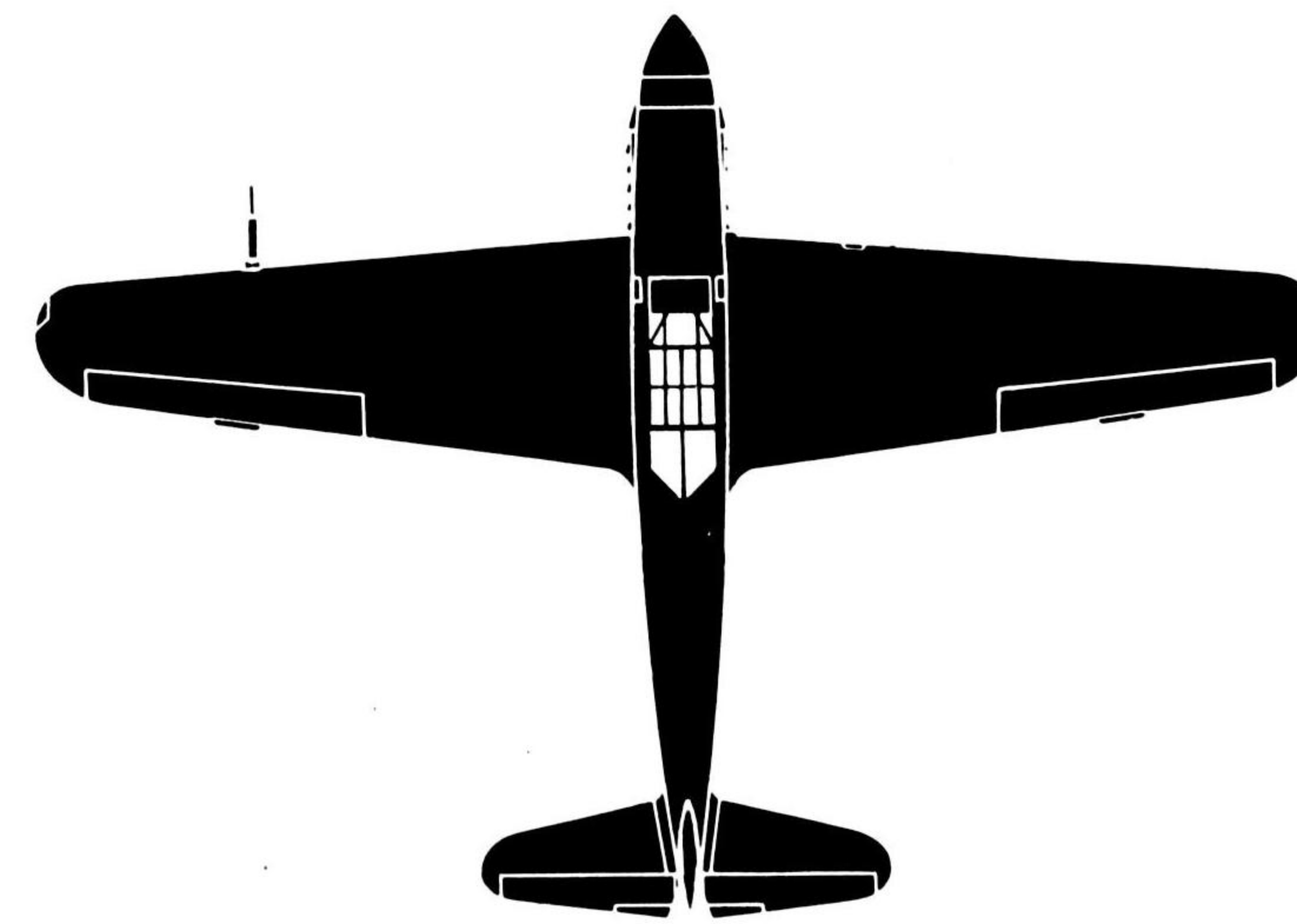
Photo Scale 1:4830

Identification Data

- Inline engine.
- Evenly tapered wing, rounded wing tips.
- Slim fuselage.
- Small tailplane.
- Small cockpit faired into fuselage.
- Low-wing construction.

TONY is also used as a light bomber. To distinguish TONY from JUDY see page 3.19.

MODEL 1



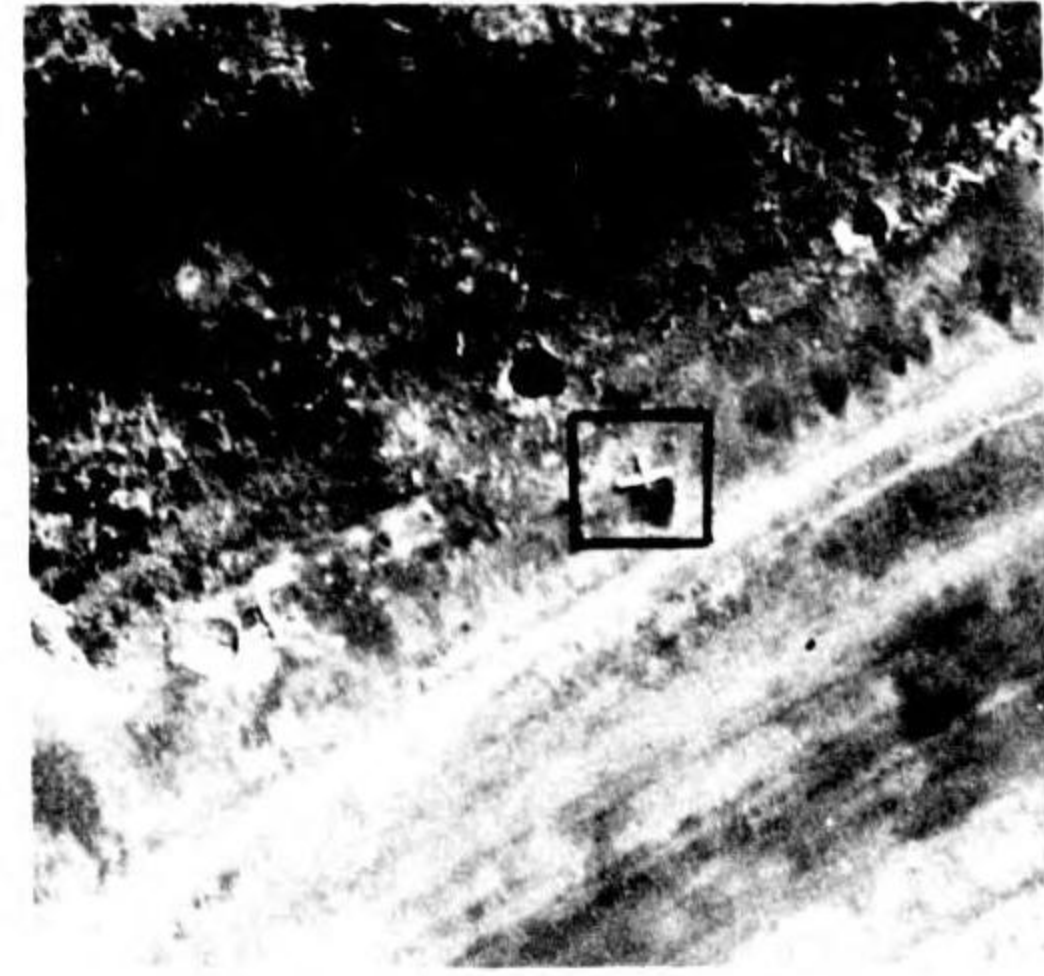


Photo Scale 1:4720



Photo Scale 1:2105

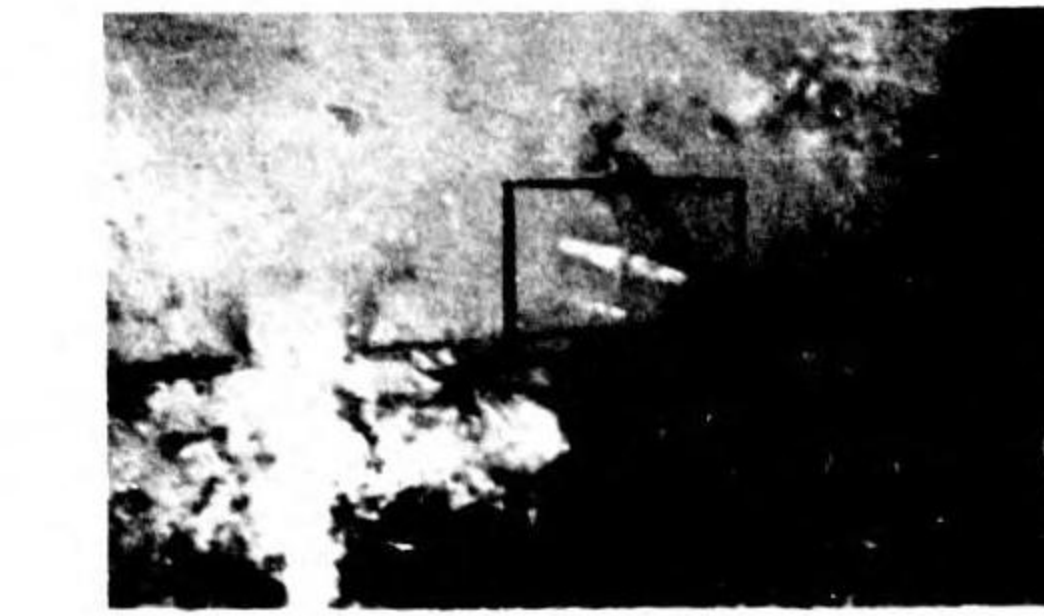


Photo Scale 1:2200

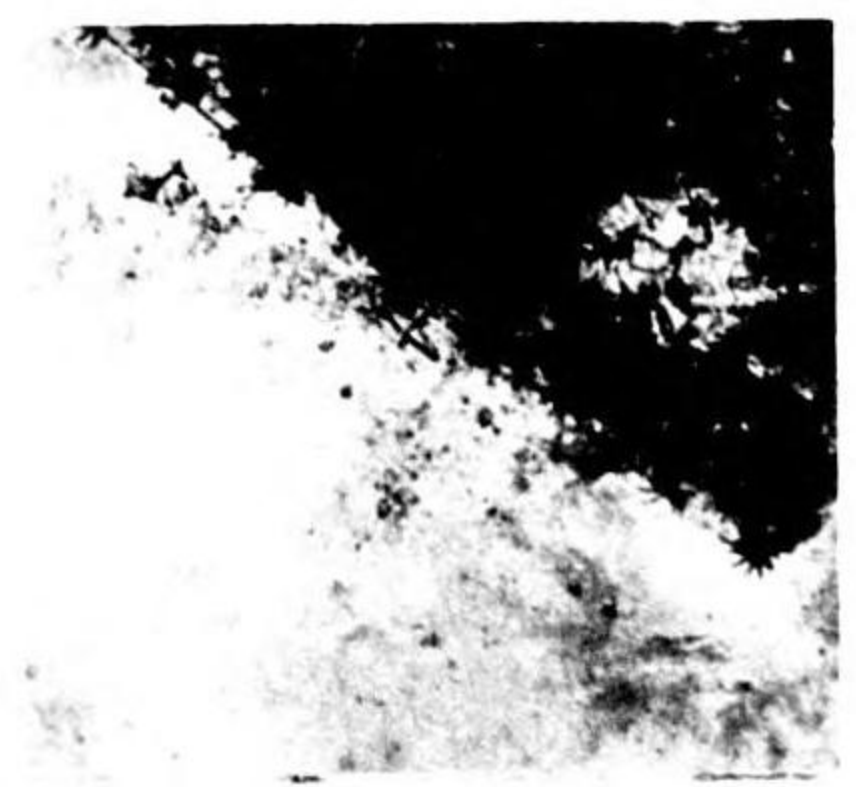
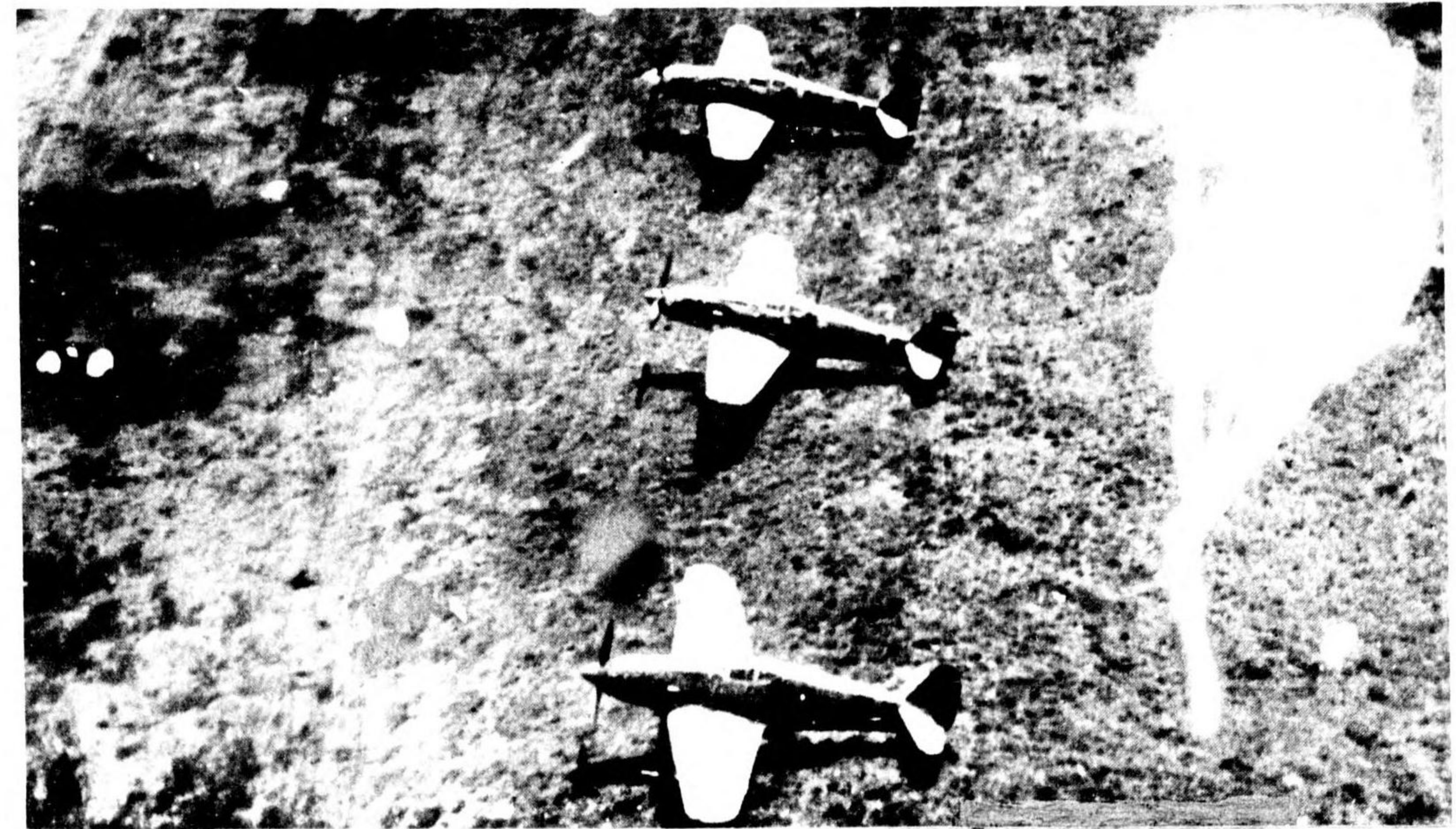
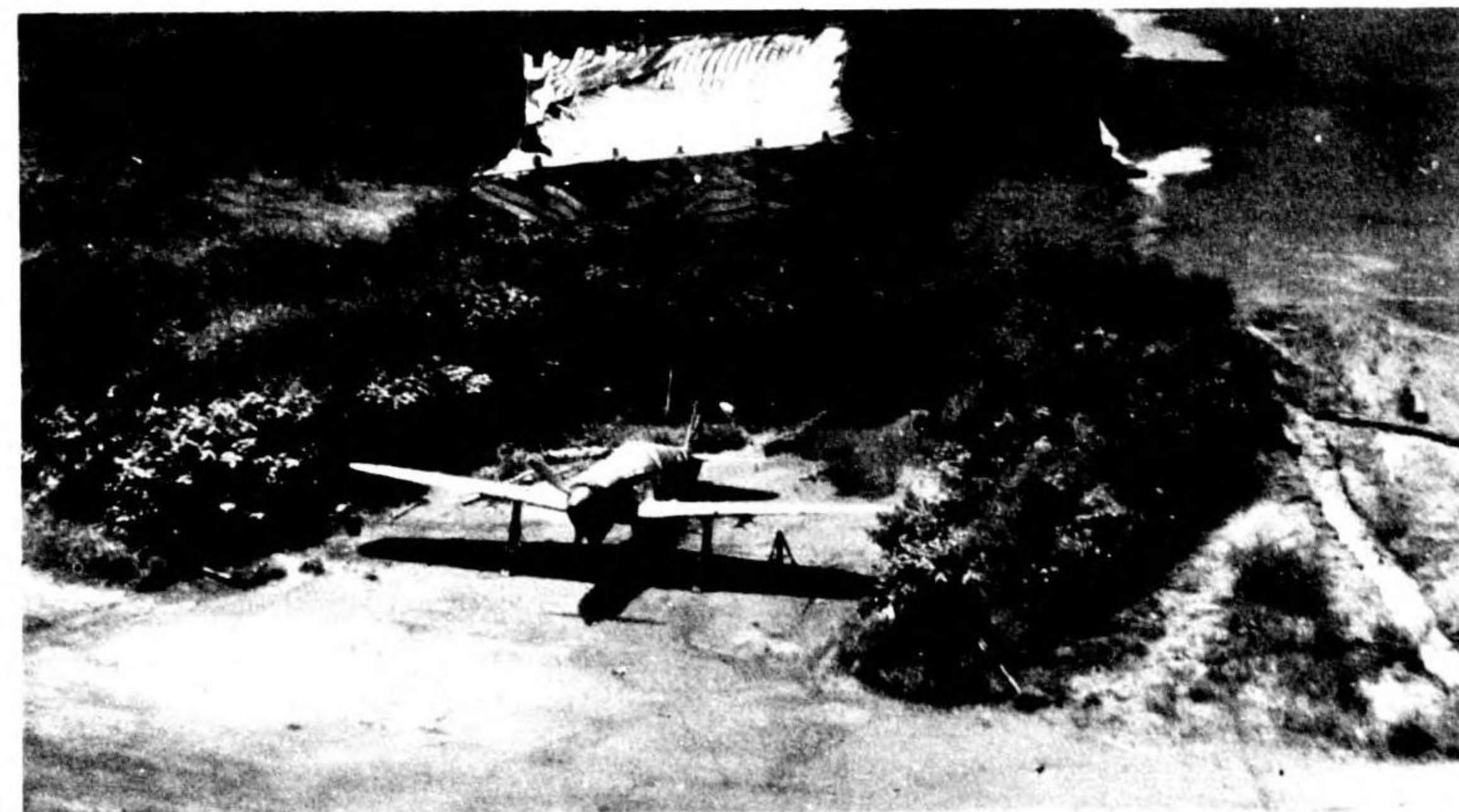


Photo Scale 1:4140



"JUDY"



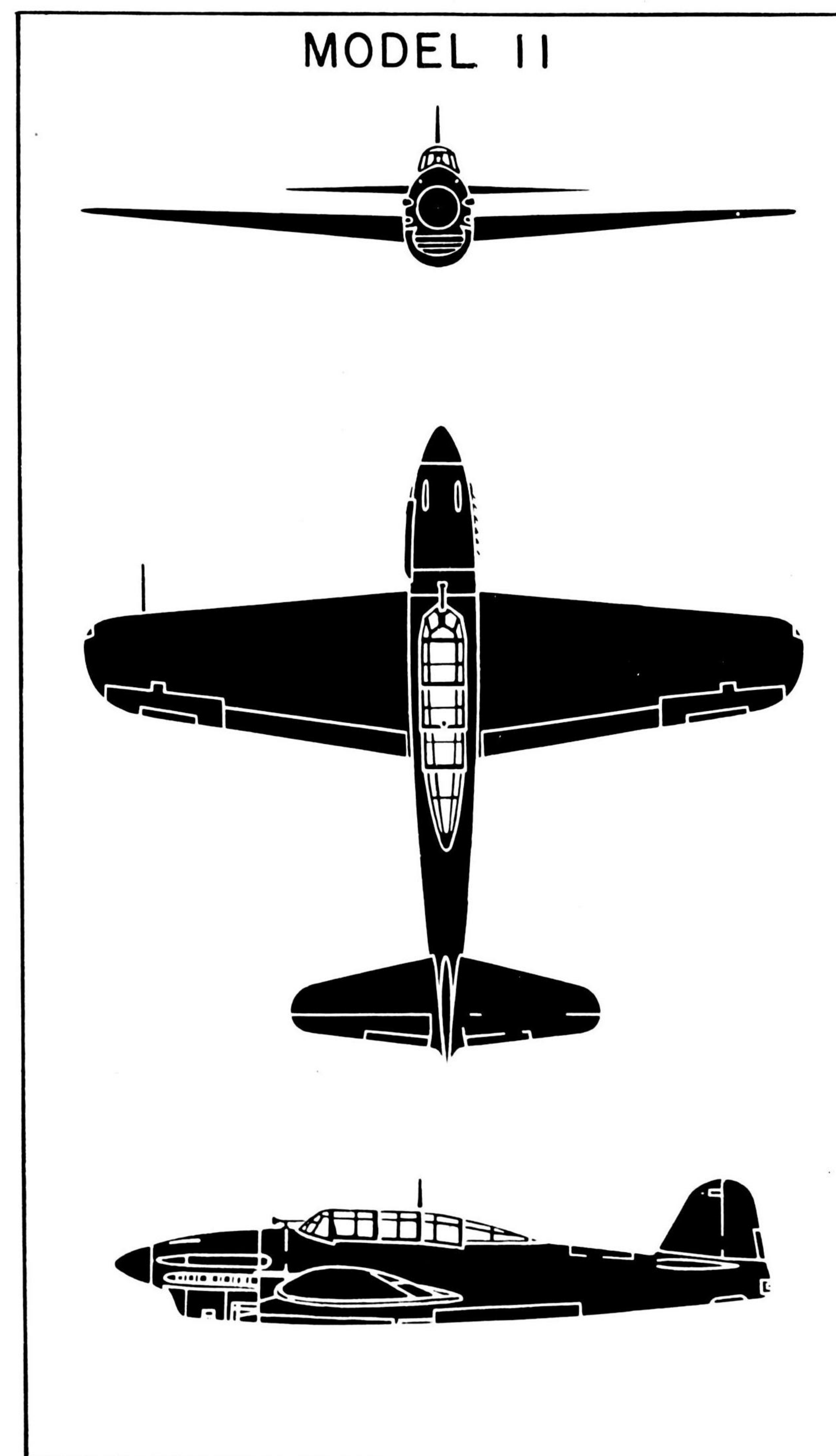
Photo Scale 1:1985

Identification Data

- Inline engine projects well forward of wing.
- Evenly tapered wing with broad, "clipped" wing tips.
- Large tailplane.
- Slim, tapering fuselage.
- Long greenhouse.
- Underslung airscoop visible on oblique photos.

A later model of JUDY has replaced the inline engine with a radial engine.

- AICHI 02
- RECONNAISSANCE-DIVE BOMBER
- S - 37' 9"
- L - 33' 7"



JUDY

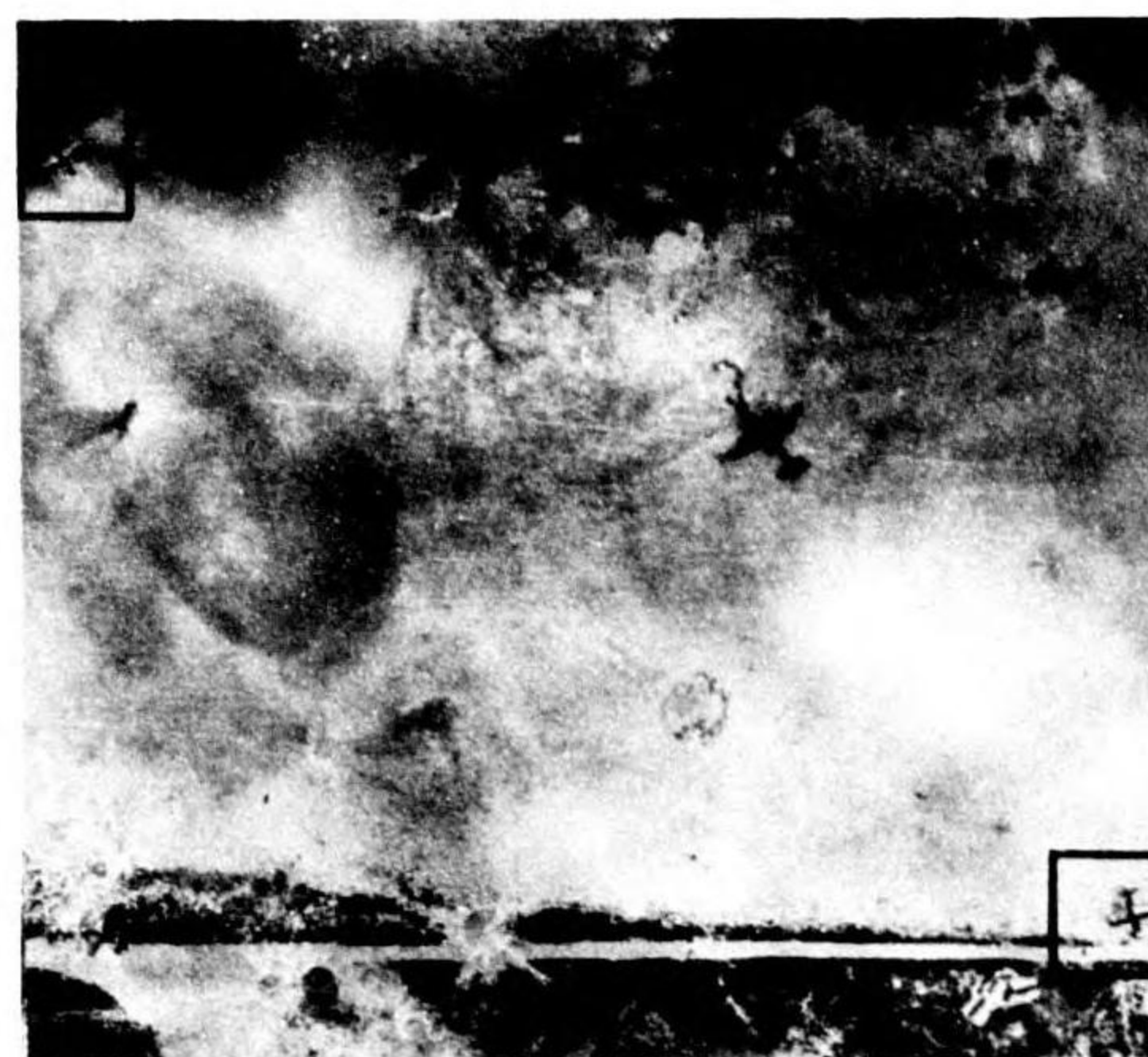
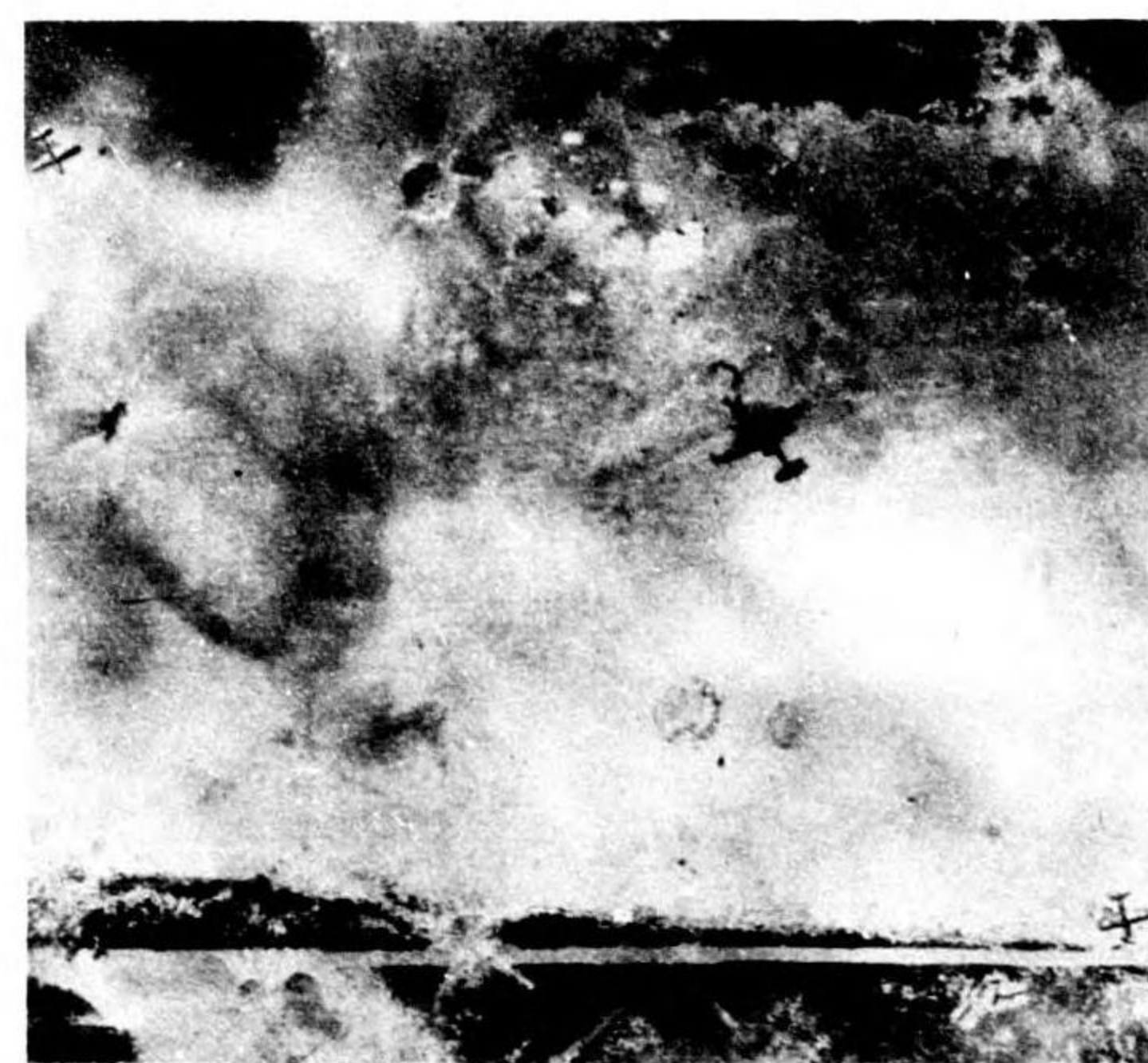
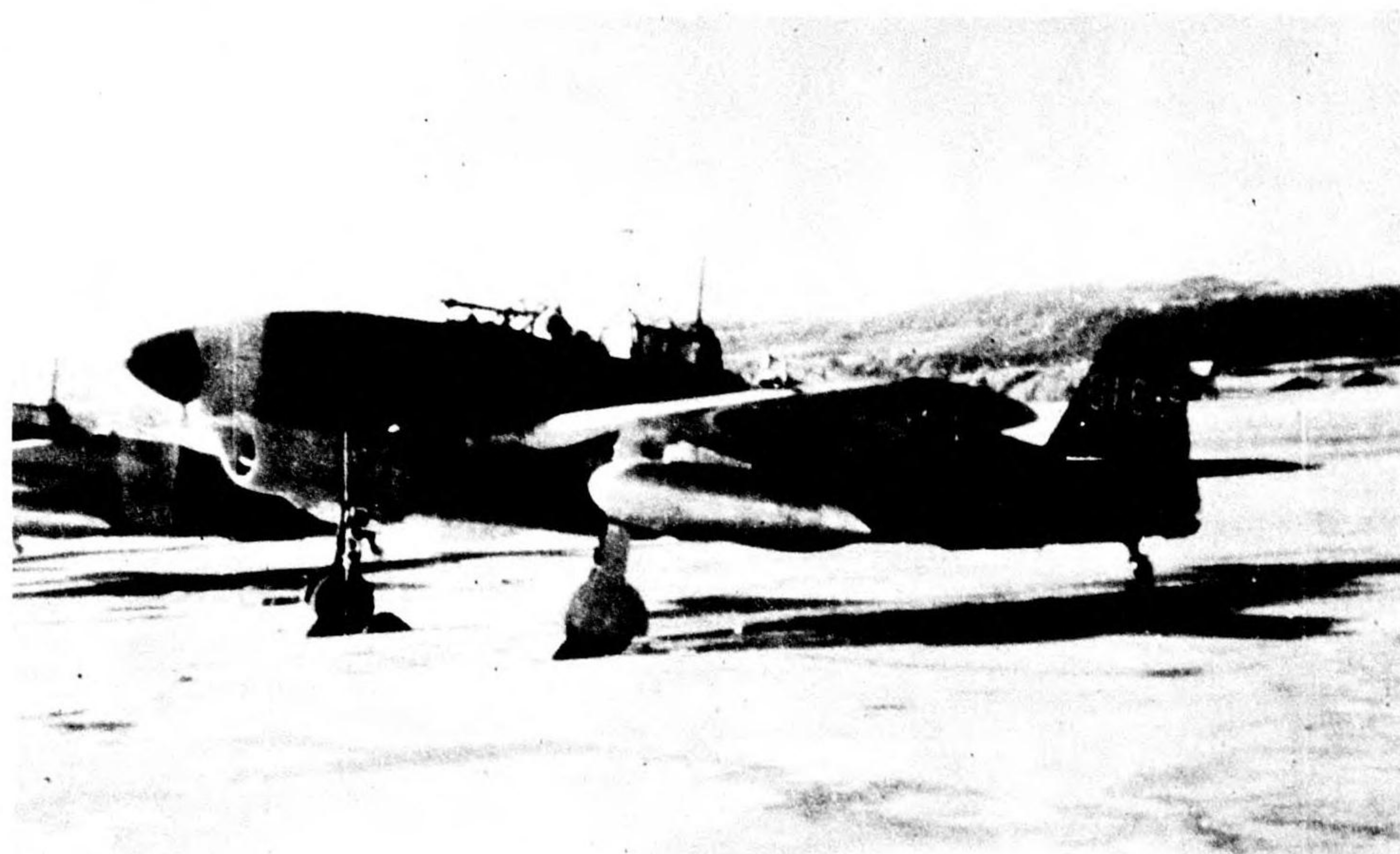
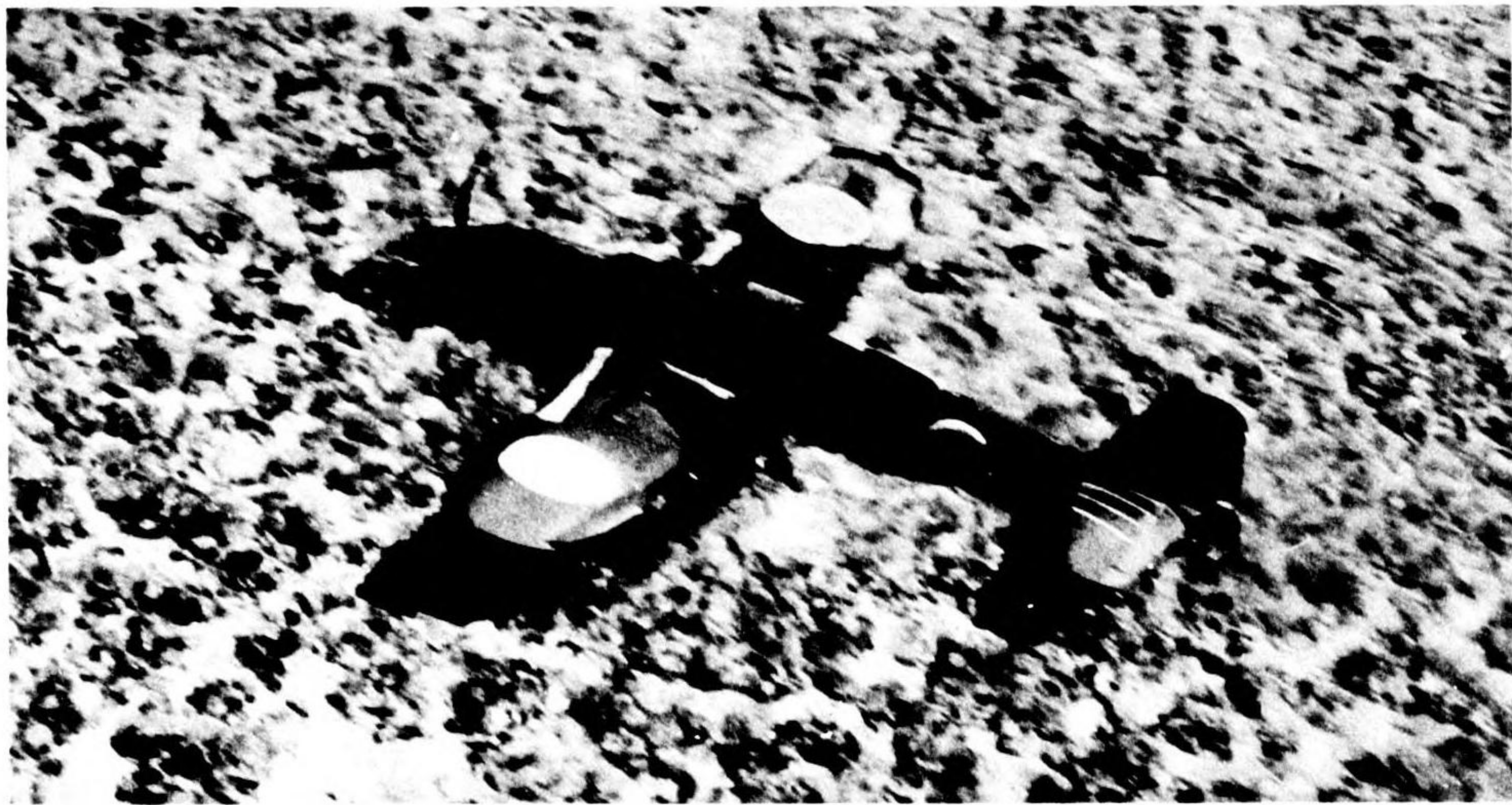
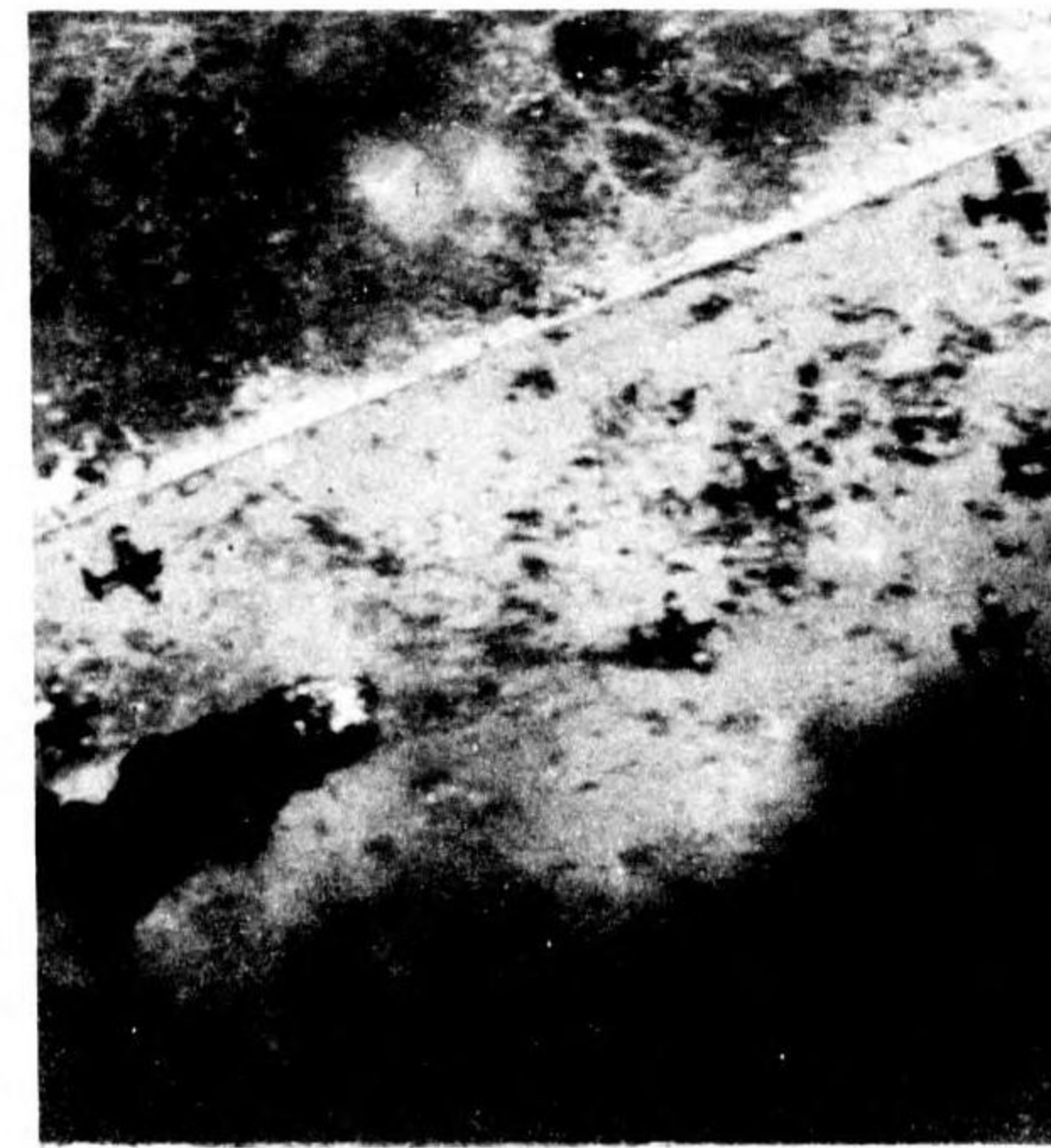


Photo Scale 1:4115

RESTRICTED



Note the air scoops on the six JUDY's above. The plane in the upper right hand corner is VAL.



Photo Scale 1:5590

JUDY is easily distinguished from TONY by its broad tapered wing and by its tailplane of wide span. Both planes have inline engines but TONY has a slim, pointed wing and a small tailplane.

Note the broad wing tip on JUDY. TONY is an Army plane, JUDY is a Navy plane.



Photo Scale 1:9370

JUDY is best distinguished from JACK by its slim fuselage. Both JACK and TONY have small cockpits while JUDY's greenhouse extends aft to a point midway from wing to tailplane.

"OSCAR"

- NAKAJIMA OI
- FIGHTER
- S - 35' 7"
- L - 29' 3"

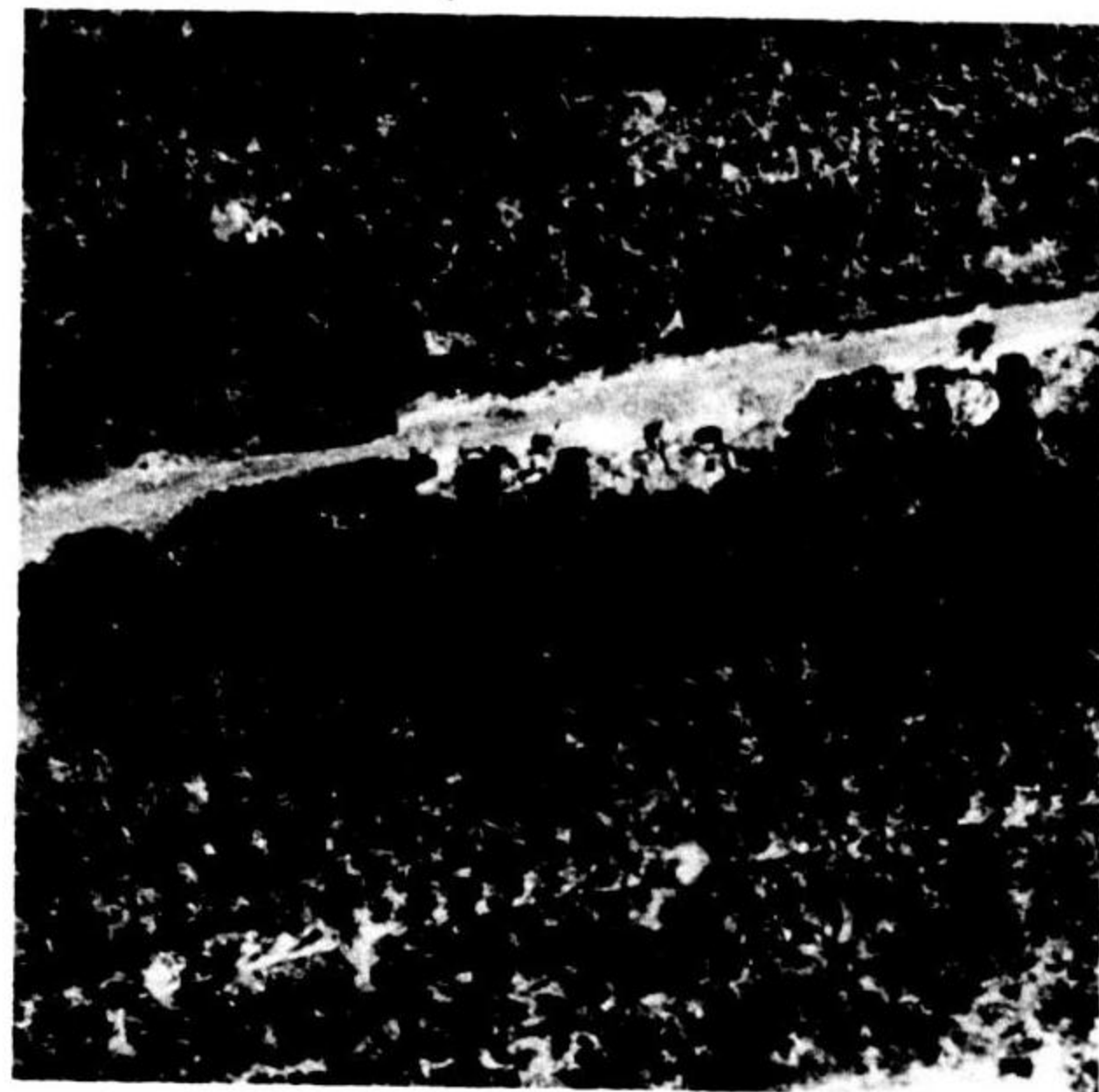
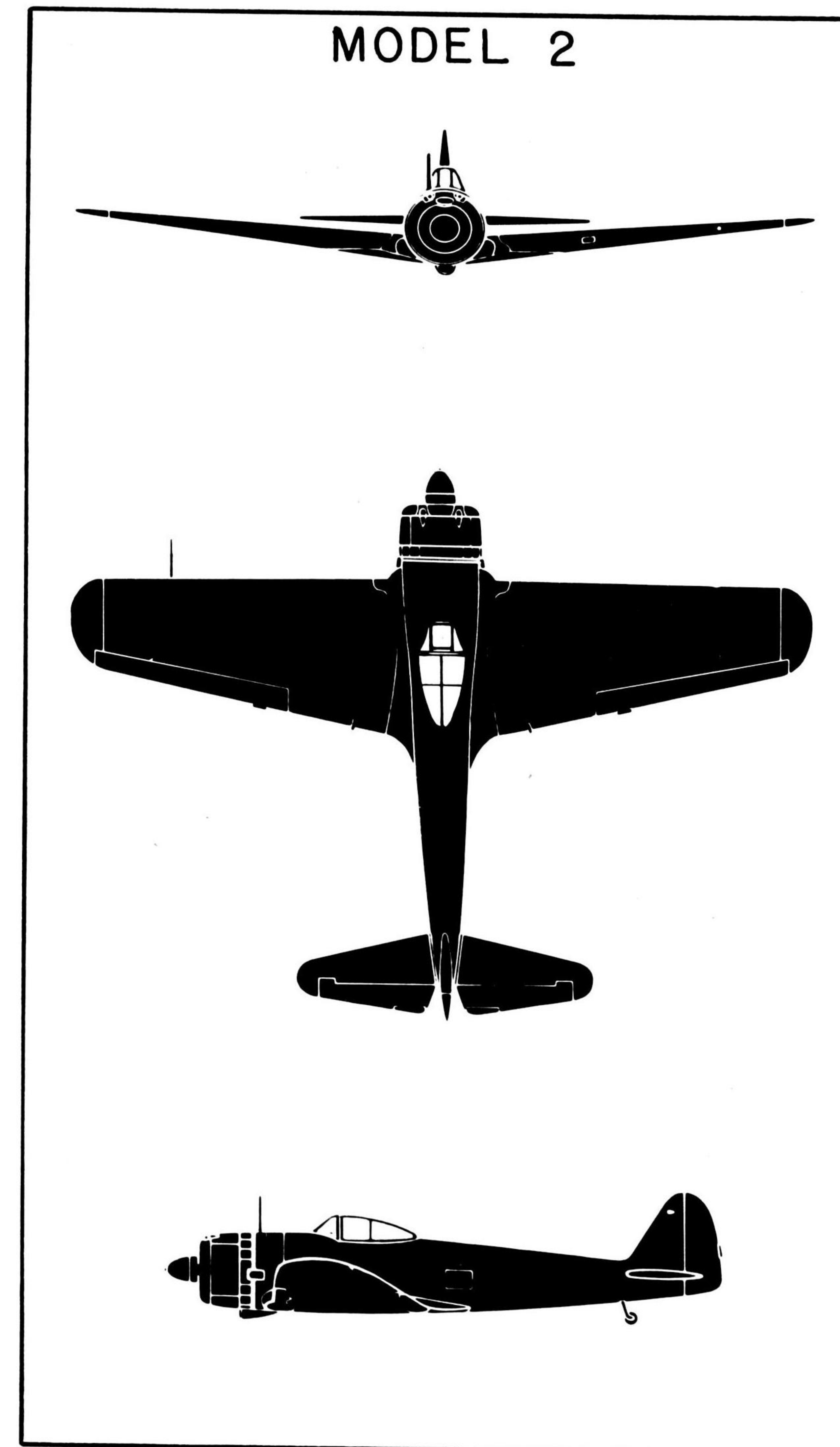


Photo Scale 1:4970

Identification Data

- Wing has straight leading edge, sharply tapered trailing edge.
- Blunt, "clipped" wing tips on Model 2, rounded wing-tips on Model 1.
- Radial engine does not project far forward of wing.
- Fuselage tapers sharply from engine aft to tailplane.
- Thin, tapered tailplane.
- Small cockpit.

OSCAR is also used as a light bomber.



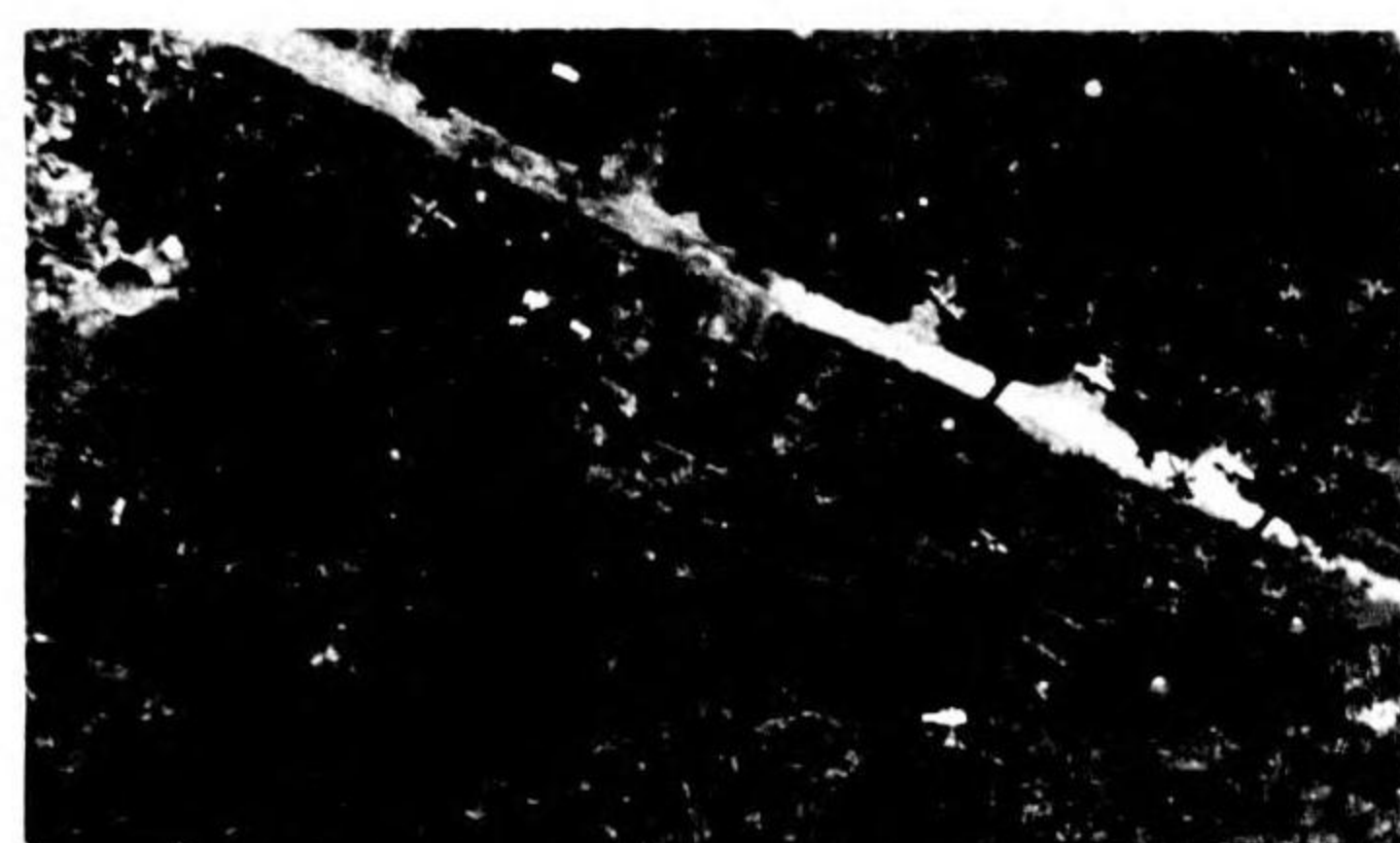


Photo Scale 1:5370



Photo Scale 1:9810

Two OSCAR's, Model 1 above. Model 1 has more pointed, rounded wing tips than Model 2 and has a greater wing span. Model 1 measures 37' 8" by 29'.



Photo Scale 1:11,875

At a smaller scale OSCAR is still easily identified. The straight leading edge, tapered fuselage and thin tailplane are distinctive.

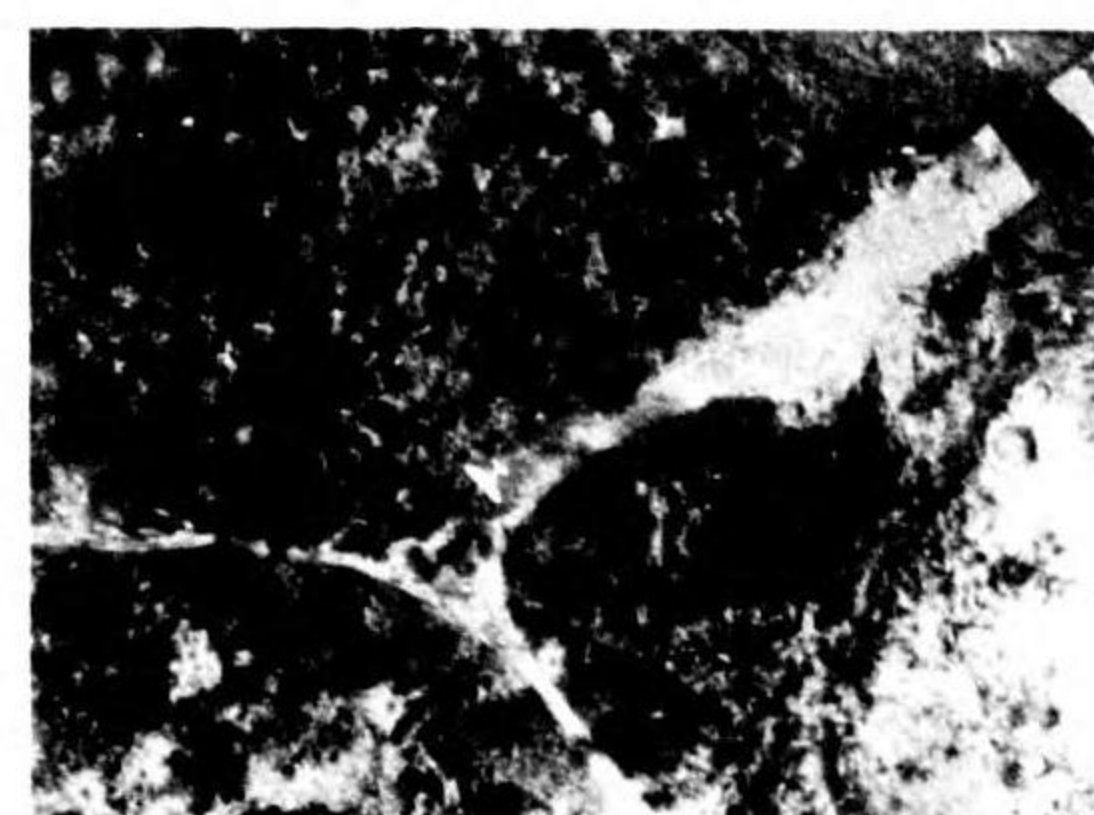
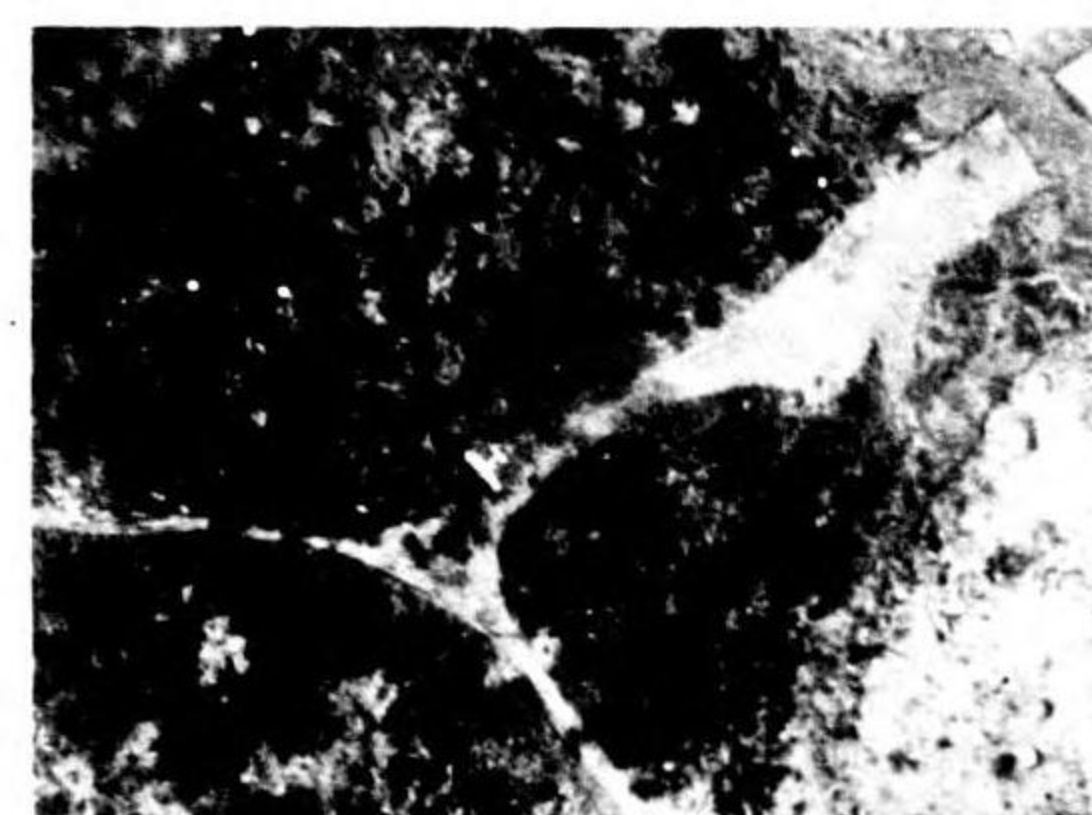
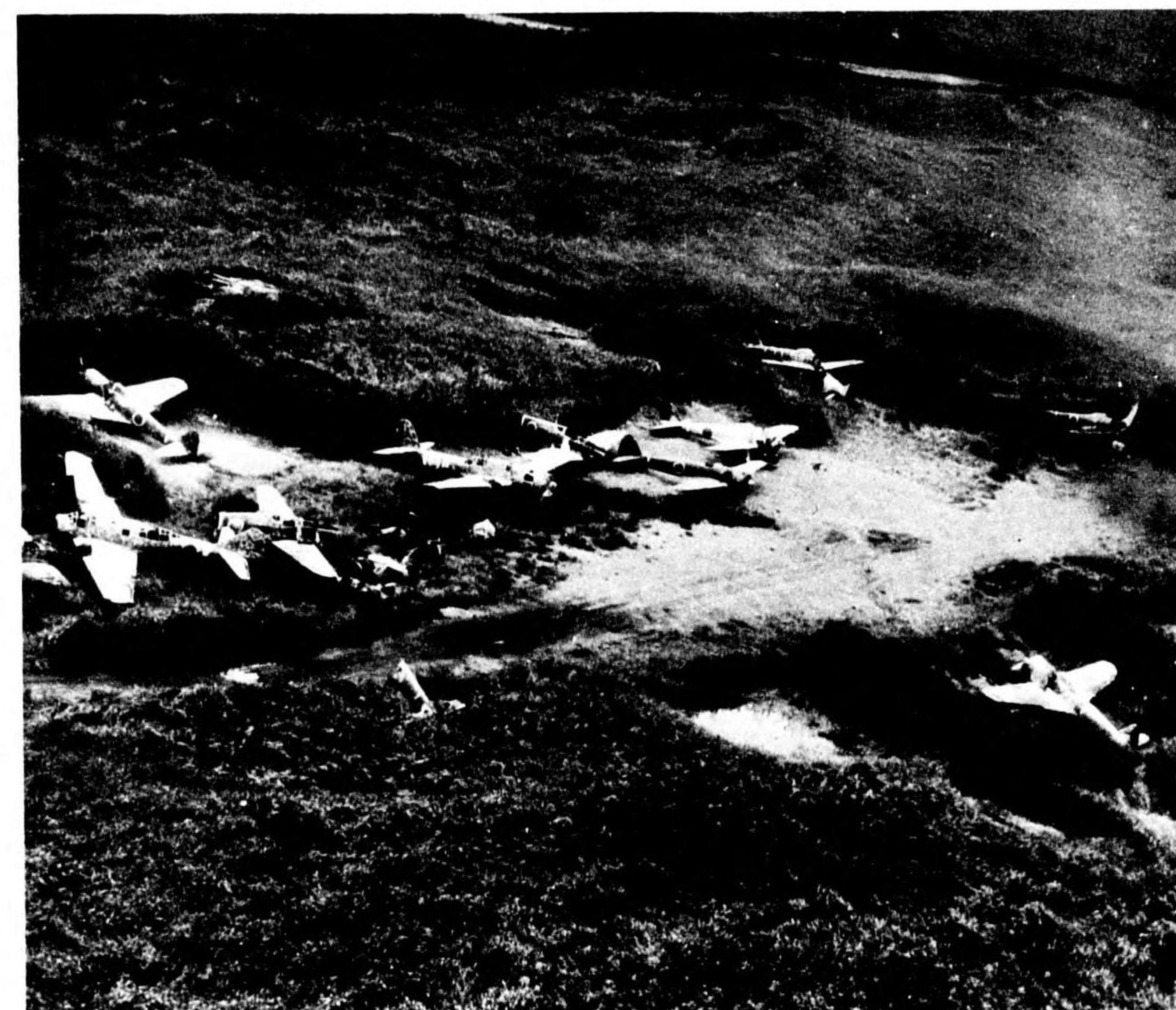
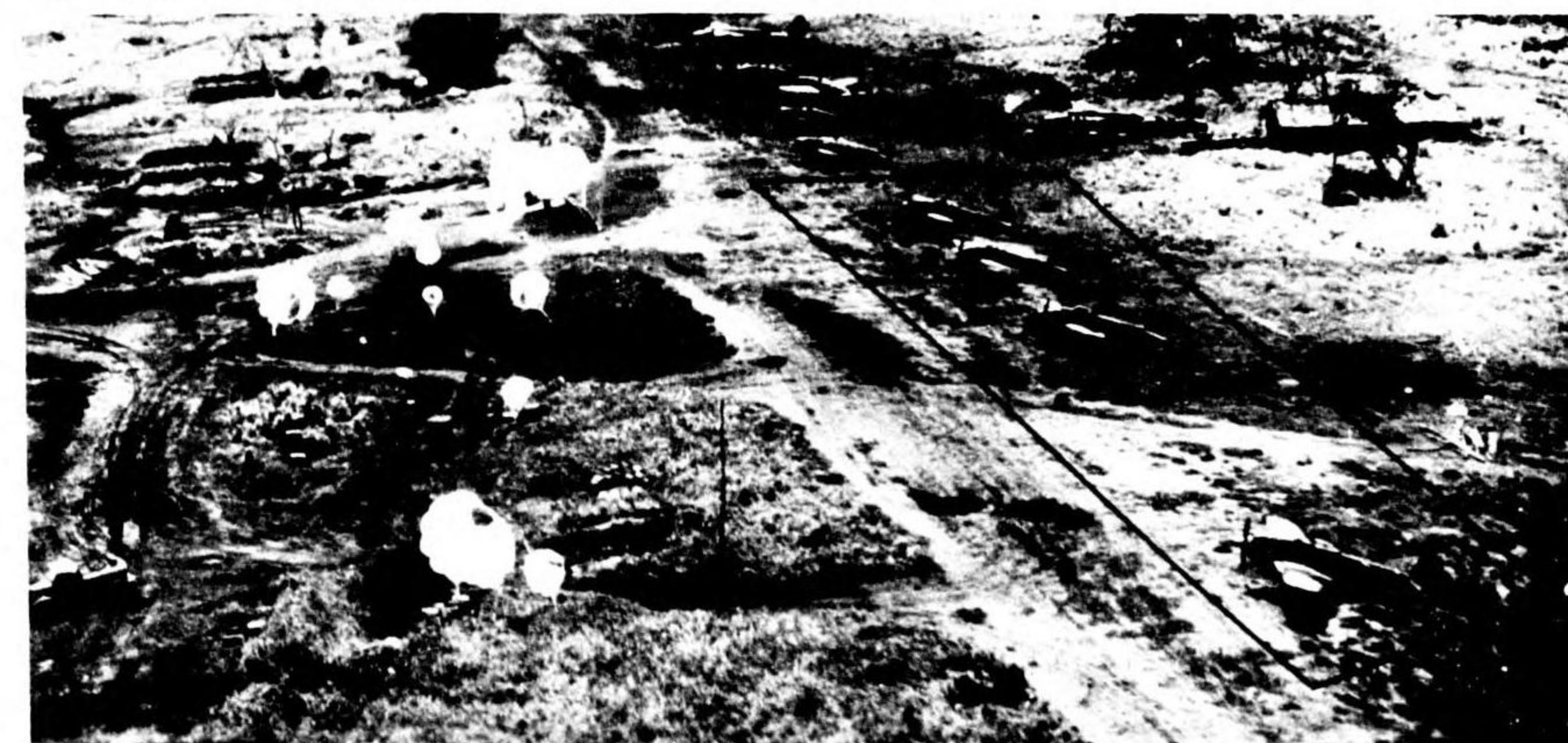


Photo Scale 1:5340

RESTRICTED



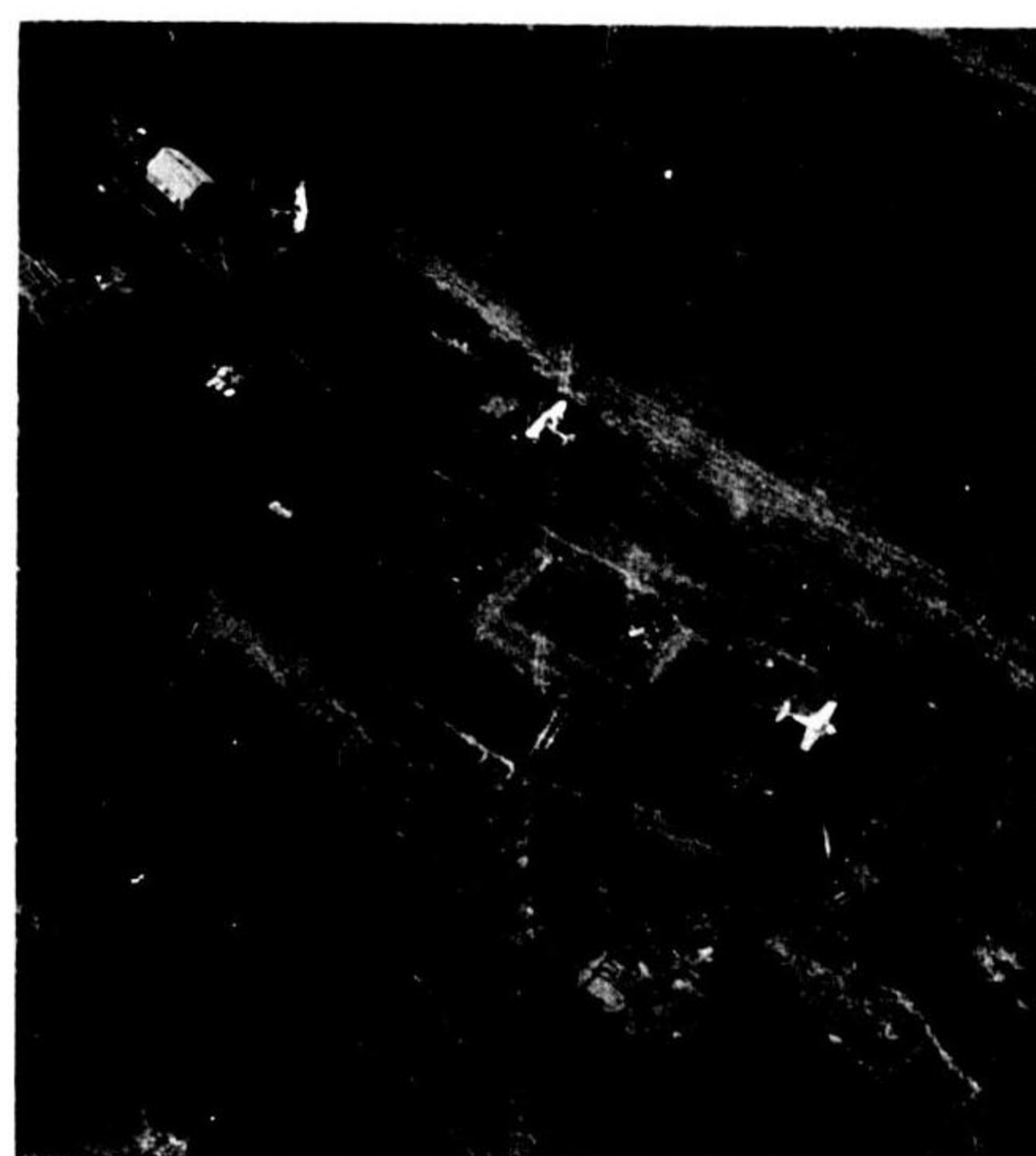
Eight OSCAR's above in various stages of serviceability. One DINAH is at the extreme left of the photo and one NICK is in the left center.



Four OSCAR's, Model 2 in the foreground above. In the background are four TONY's and two HELEN's.



"FRANK"

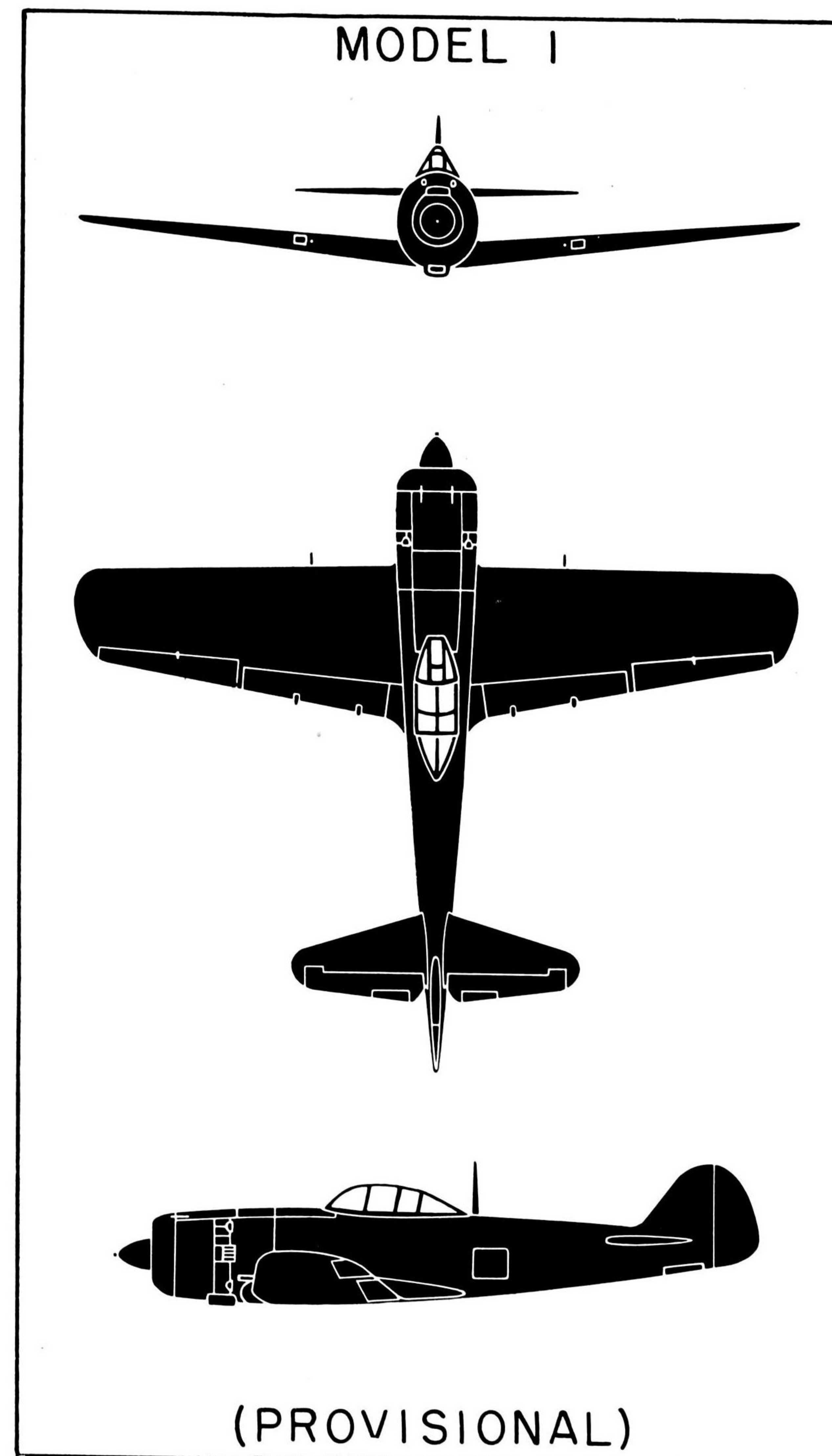


Identification Data

- Low-wing monoplane.
- Slight taper on leading edge of wing, sharp taper on trailing edge.
- Blunt wing tips.
- Radial engine projects well forward of wing.
- Slim tailplane of wide span.
- Rudder projects well aft of tailplane.
- Small rounded fin and rudder.
- Small cockpit set near trailing edge of wing.

FRANK resembles both TOJO and OSCAR but reportedly will replace TOJO. The wing shape and span is close to that of OSCAR 2 but does show a slight taper on the leading edge in contrast to OSCAR. The fuselage shape and rudder projection show resemblance to TOJO. FRANK is a larger plane than TOJO and has a different wing shape.

- NAKAJIMA
- FIGHTER
- S - 37' 1"
- L - 32' 4"



- MITSUBISHI
- FIGHTER
- S - 35' 5"
- L - 31' 9"

"JACK"

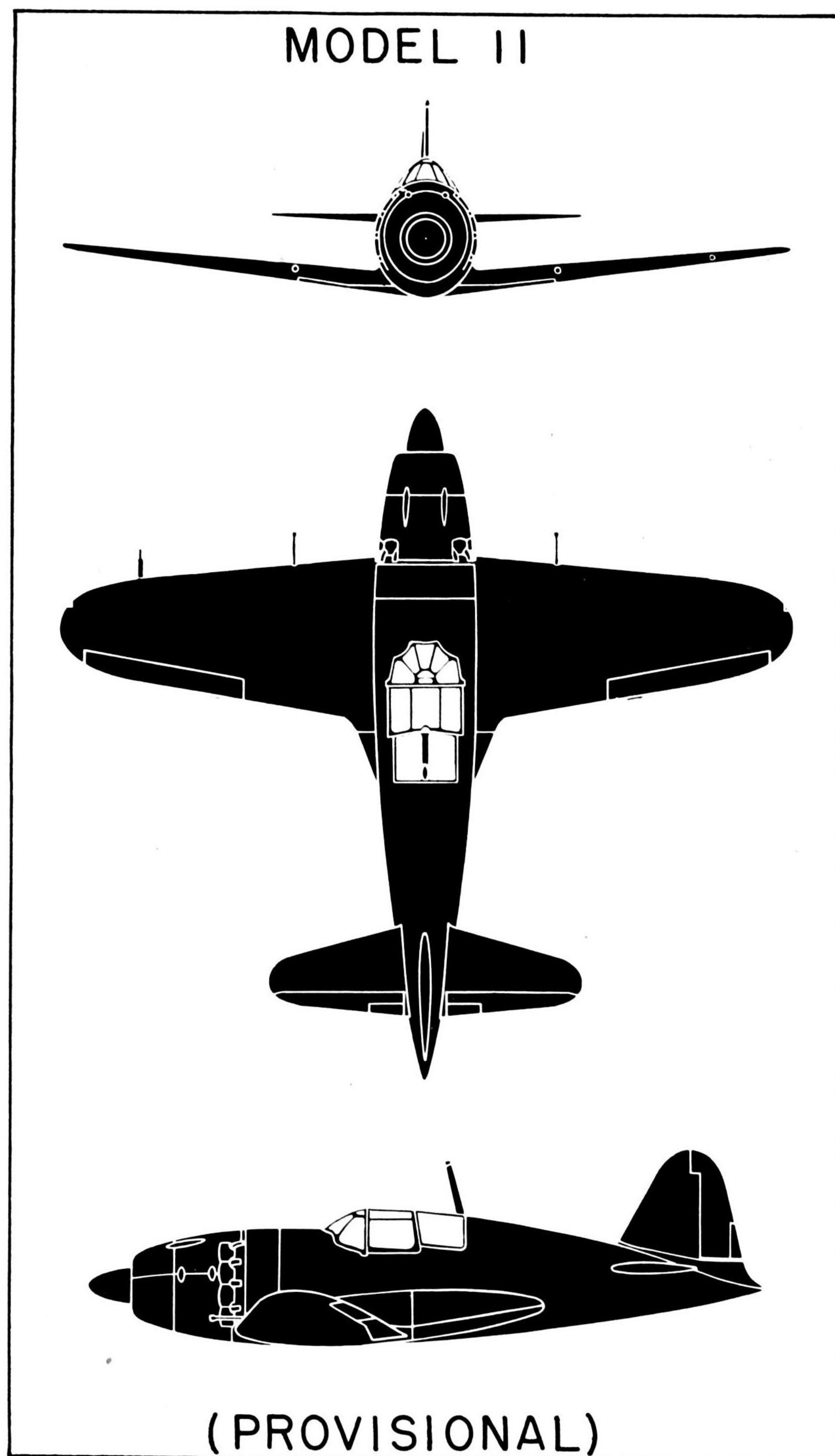


Photo Scale



1:2660

Identification Data

- Wing has even taper, rounded tips.
- Fat fuselage.
- Radial engine tapers forward to a large spinner giving the impression of a large inline engine.
- Small but broad cockpit.
- Fuselage and rudder project aft of a slim, tapered tailplane.

JACK is one of a family of short-range interceptor fighters for use versus bombers.

JACK



Photo Scale



1:5060

Eight JACK's at Iwo Jima in the Kazan Retto. JACK is probably the plane long reported in the Pacific as a Navy TOJO.



Photo Scale

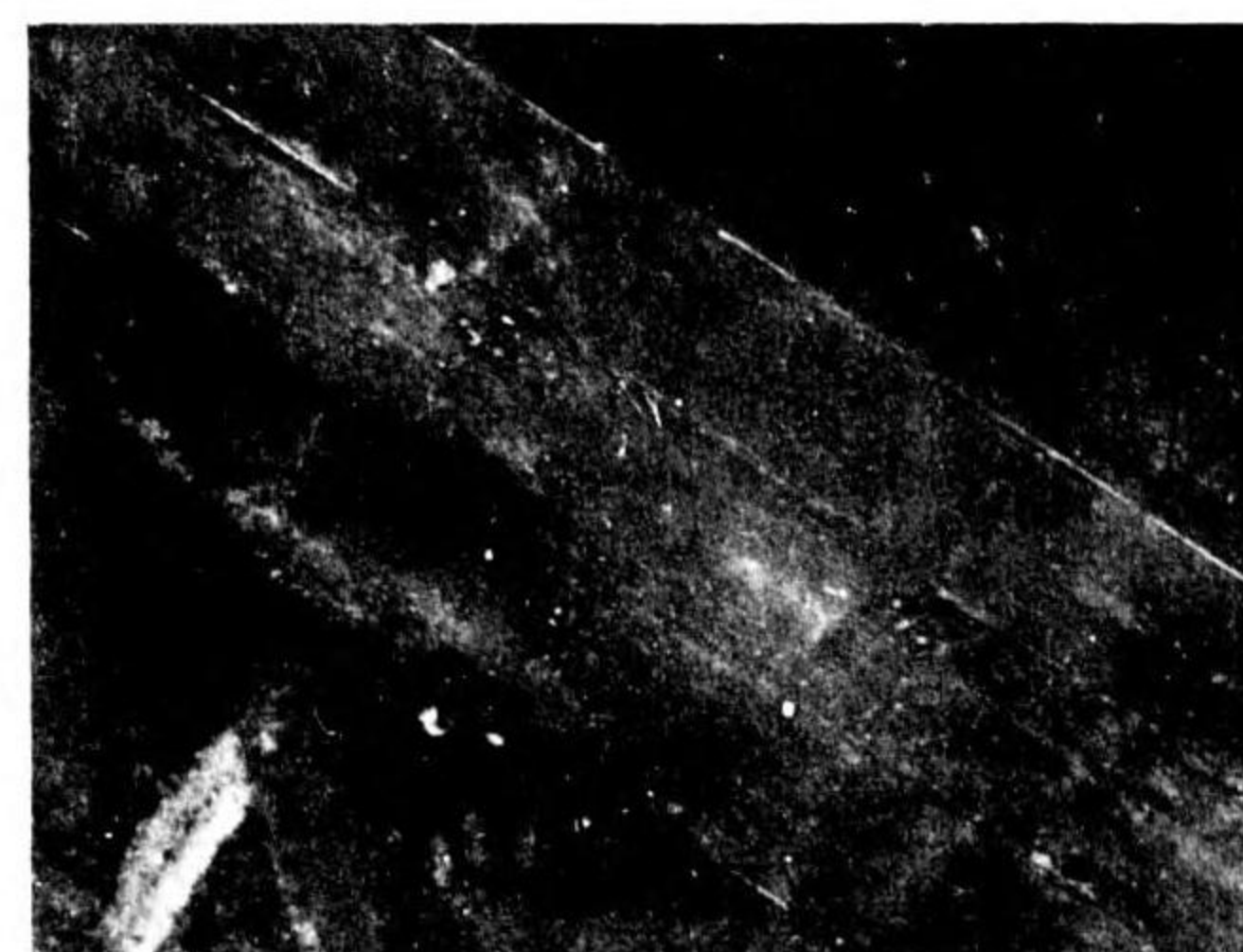


1:4825

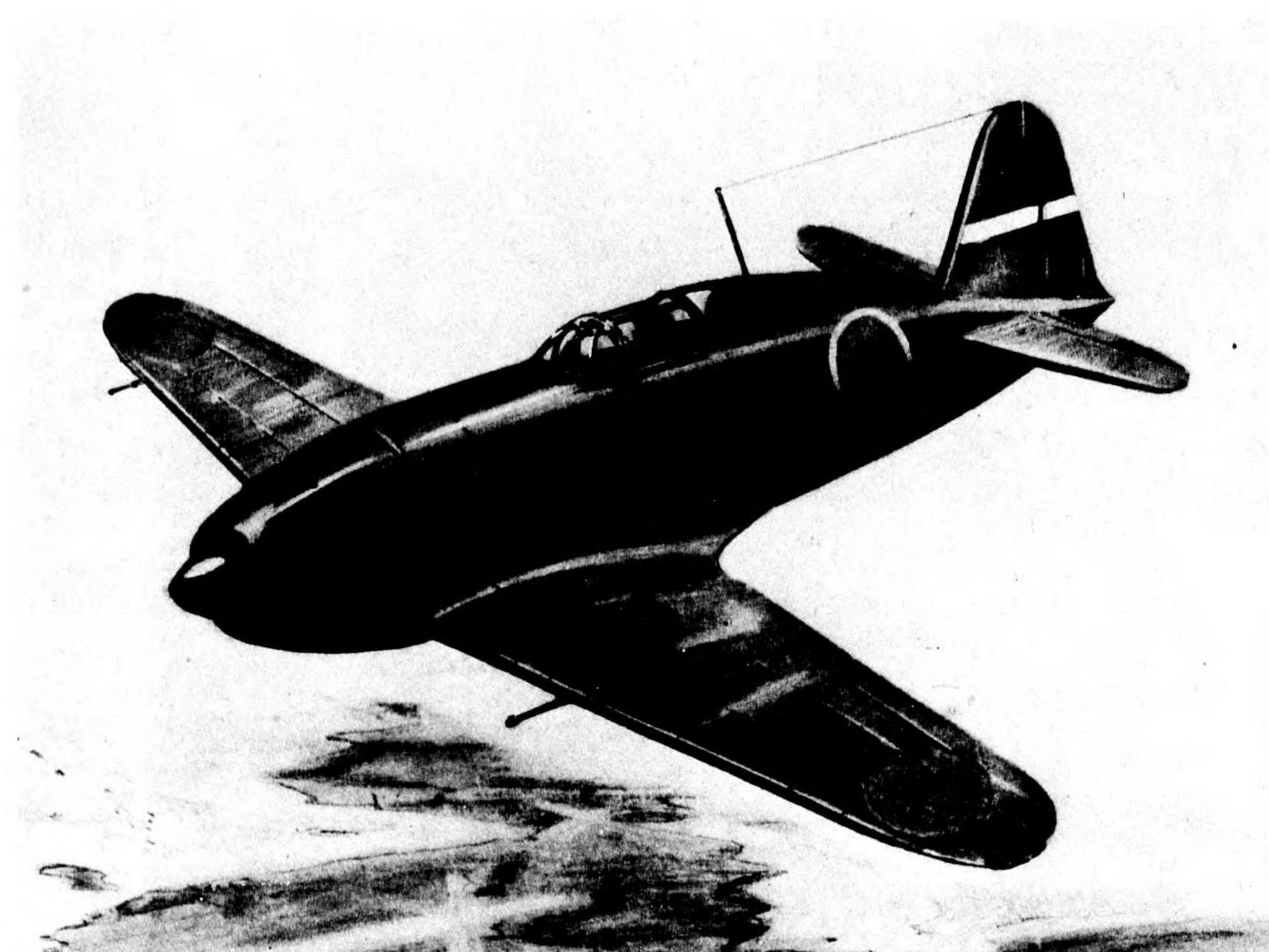
Two JACK's at Iwo Jima. At a small scale JACK will be difficult to differentiate from ZEKE 52. Note above the fatness of the fuselage above the wing, the broad dark blotches indicating the cockpits and the way the radial engine tapers forward. The fuselage projects slightly aft of the tailplane.



Photo Scale



1:4045



JACK approximates in size both ZEKE 52 and JUDY. The rendering above shows how JACK gives the impression of a large inline engine, further resembling JUDY. The engine tapers forward noticeably to a large spinner. Note, however, that JUDY's fuselage is much slimmer, its tailplane is larger and its wing tips more blunt. JUDY's greenhouse, if visible, is considerably longer.

JACK will be hardest to differentiate from ZEKE 52. The wing and tailplane patterns are very similar. Points to note are the tapered engine on JACK, the broader fuselage and cockpit and the smaller projection aft of the tailplane on JACK.

TOJO is smaller than JACK but with its very fat fuselage and small wing could easily be mistaken for it. TOJO's fuselage will appear fatter in relation to its wing than JACK's fuselage. Also TOJO's engine has no taper and the wing has a different shape.



Photo Scale



1:9040

- NAKAJIMA 02
- FIGHTER
- S - 31'
- L - 29' 3"

"TOJO"

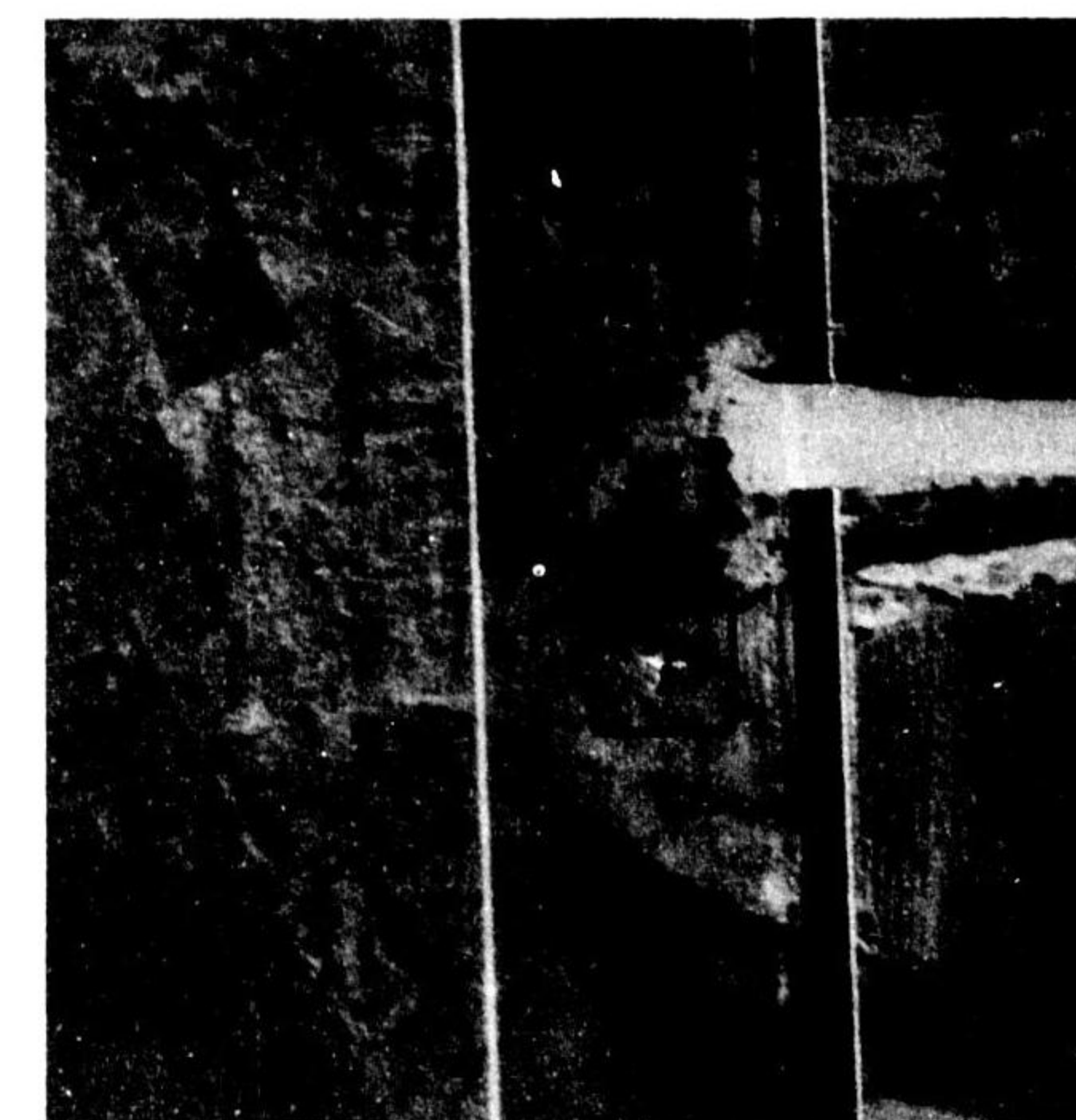
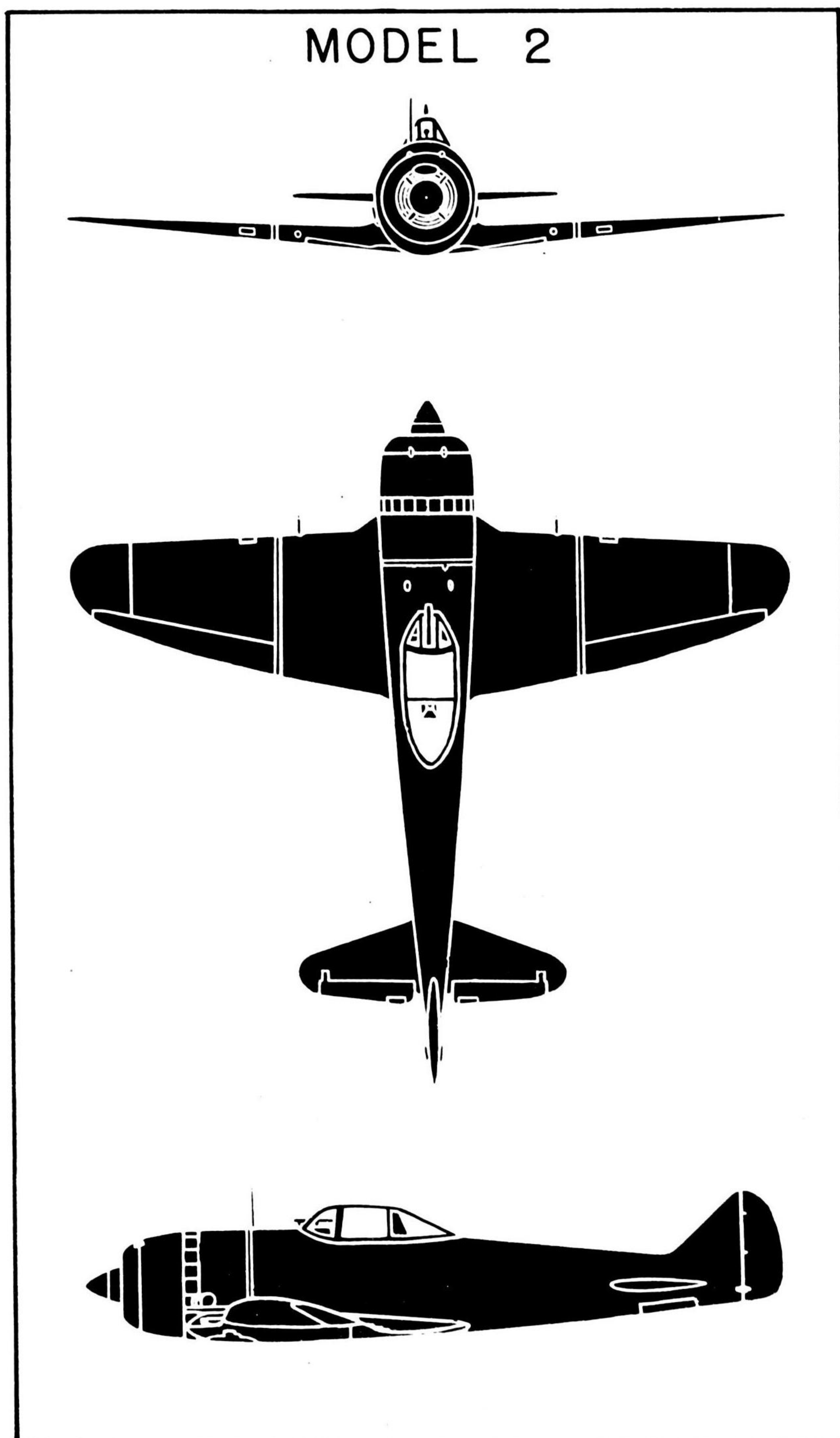


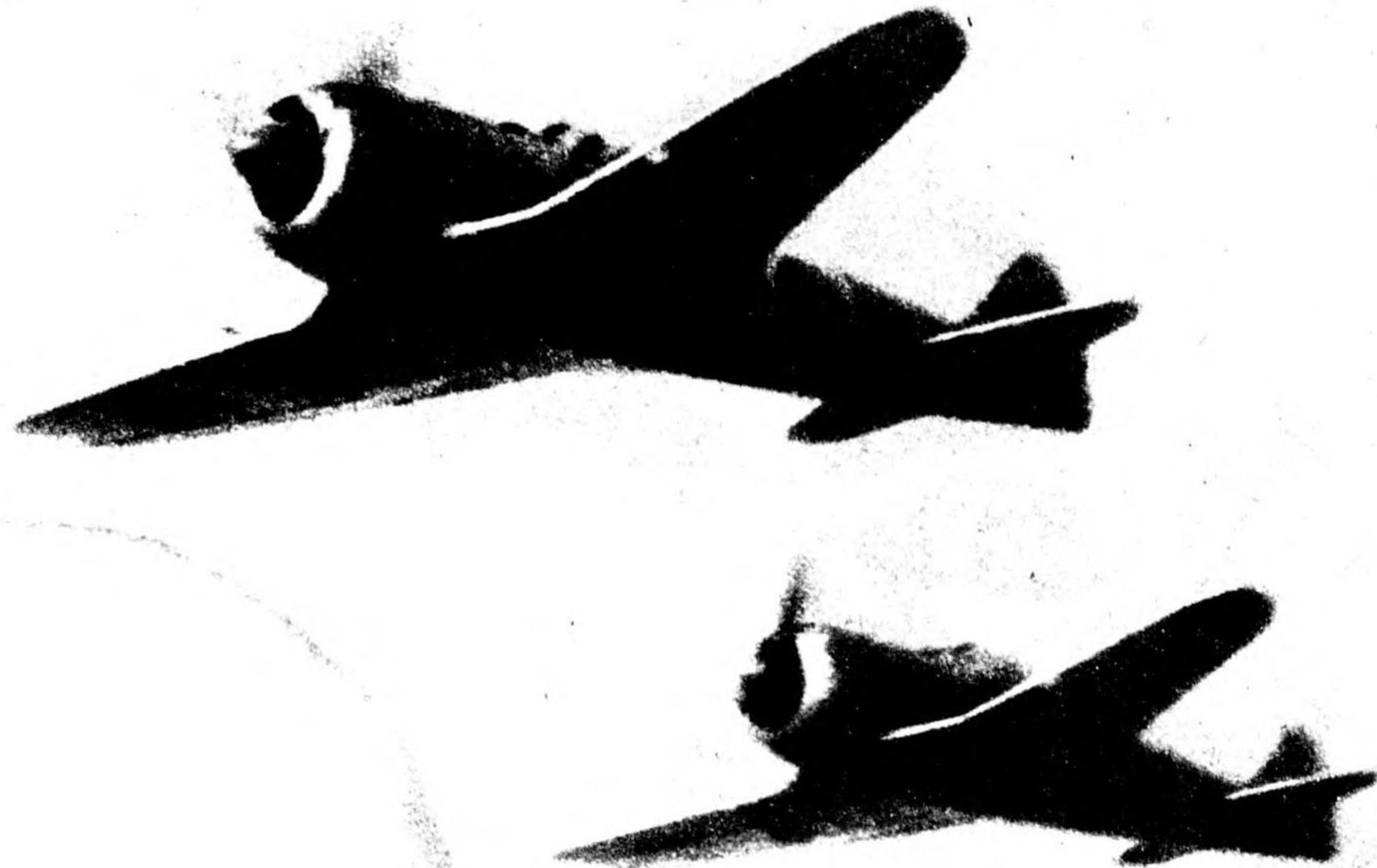
Photo Scale

1:3575

Identification Data

- Wing has straight leading edge, elliptical trailing edge and rounded wing tips.
- Fat, stubby radial engine.
- Fat, tapered fuselage.
- Small, tapered tailplane.
- Rudder projects aft of tailplane.
- Small cockpit.

TOJO



TOJO presents a stubby, barrel-like appearance from all views. The fat fuselage is supported by a slim wing having a span of only 31 feet. When seen in stereo the fat fuselage, the straight leading edge and elliptical trailing edge of the wing and the long projection of the rudder aft of the tailplane are prime identification features.

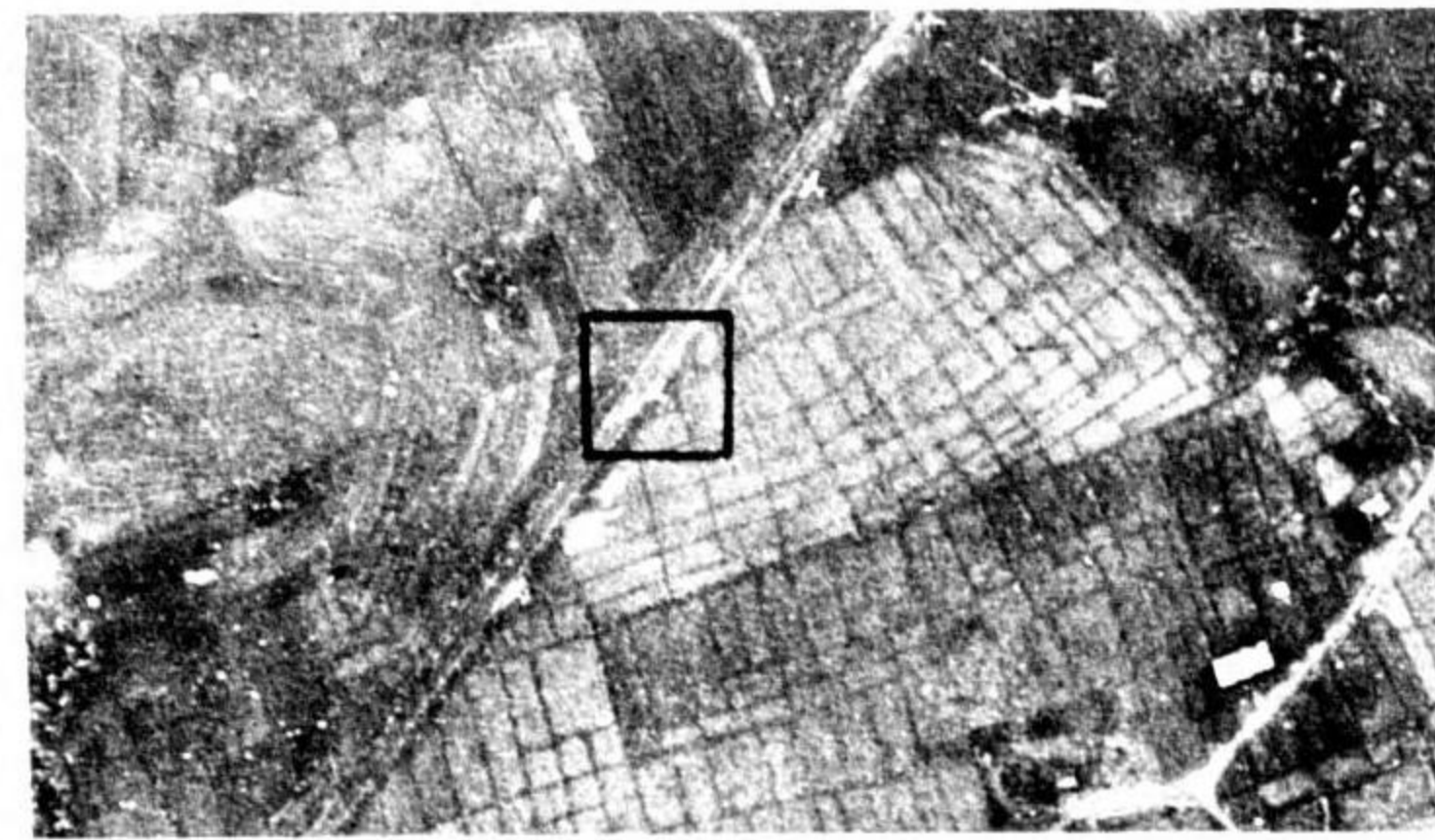
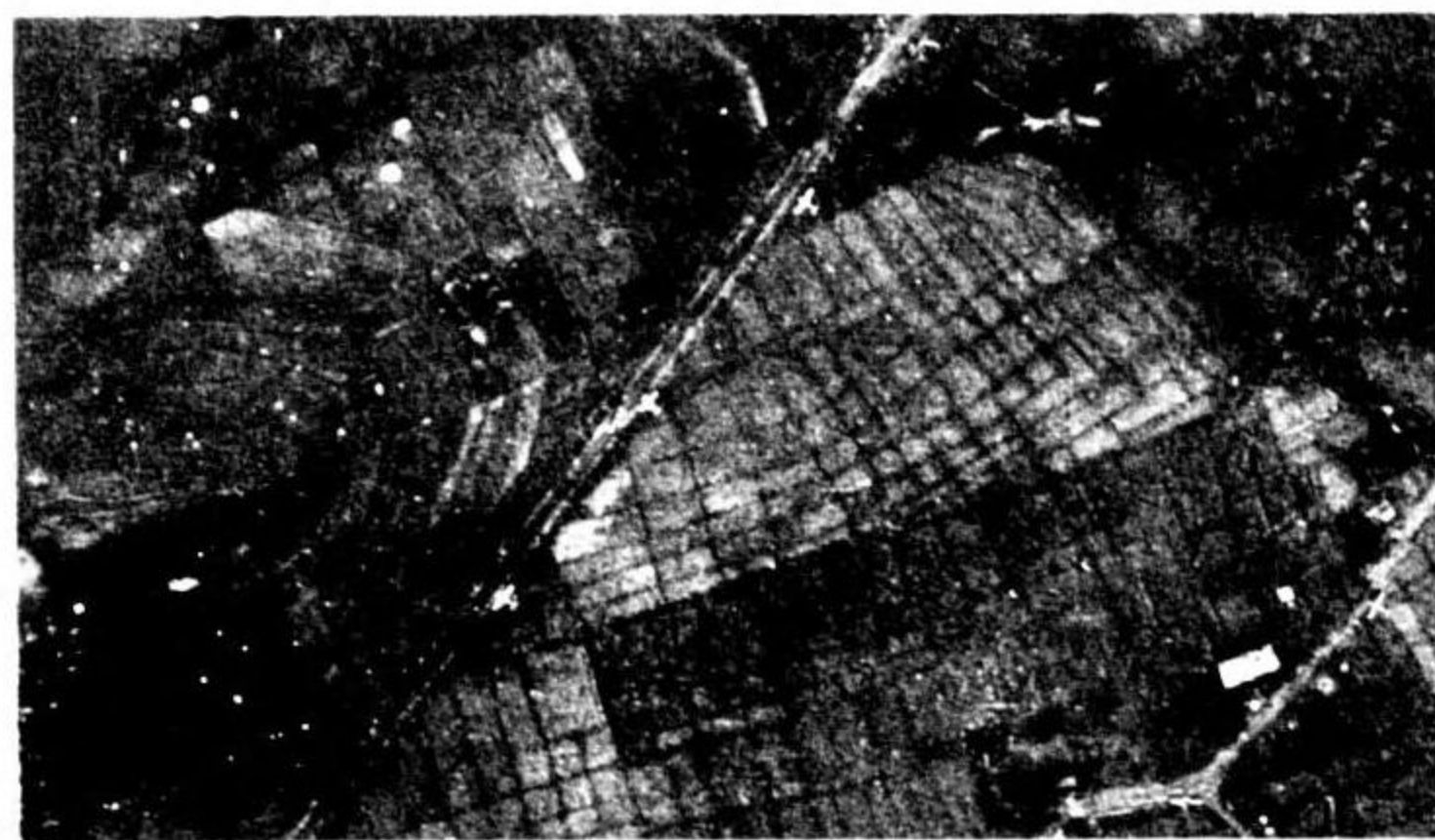
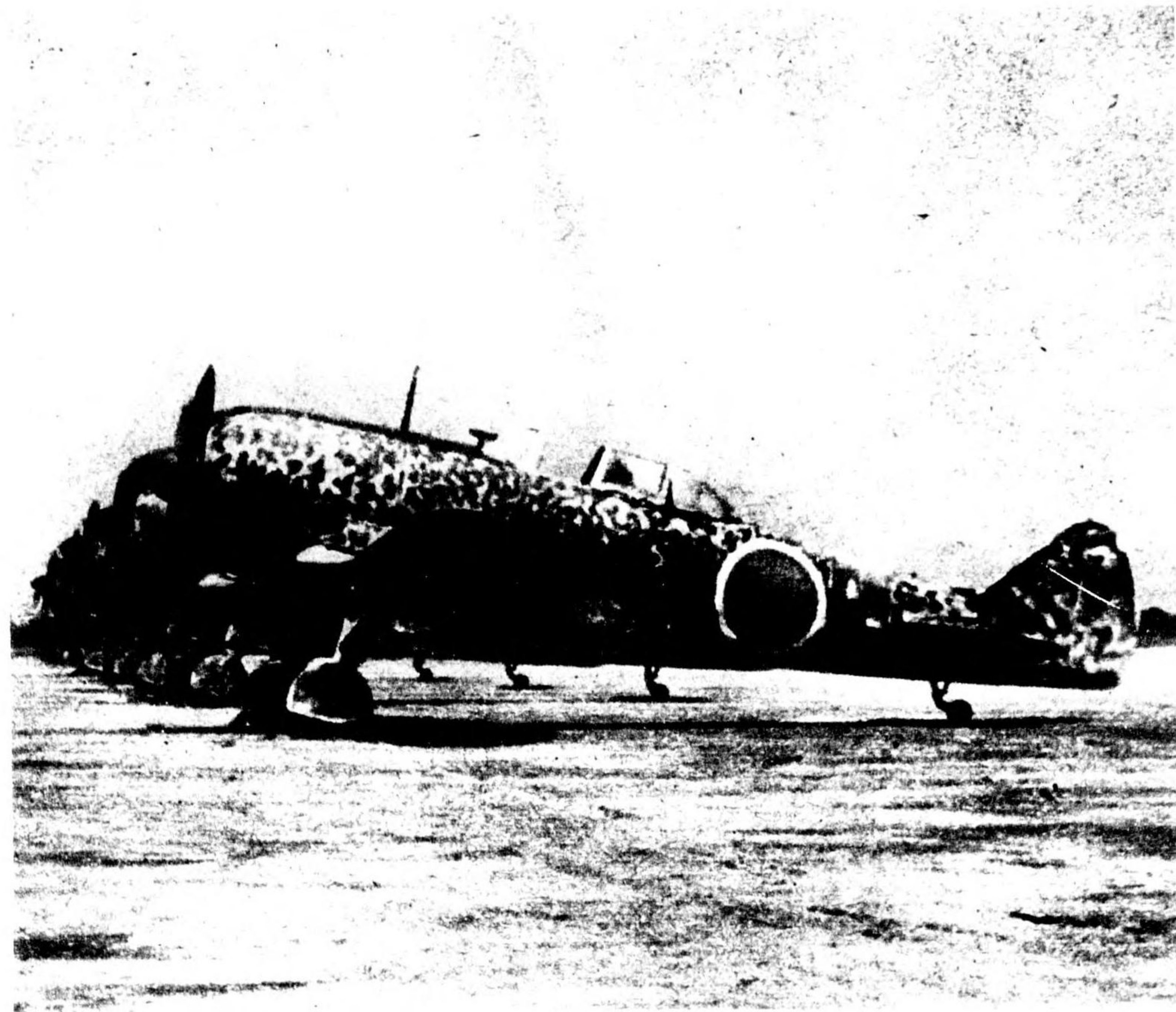


Photo Scale

1:8270



TOJO has been used sparingly in the South and Southwest Pacific. The Navy fighter JACK may be confused with TOJO. To distinguish these two planes, see page 3.24. TOJO also bears resemblance to the new Army fighter FRANK (see page 3.22).

SECTION-4

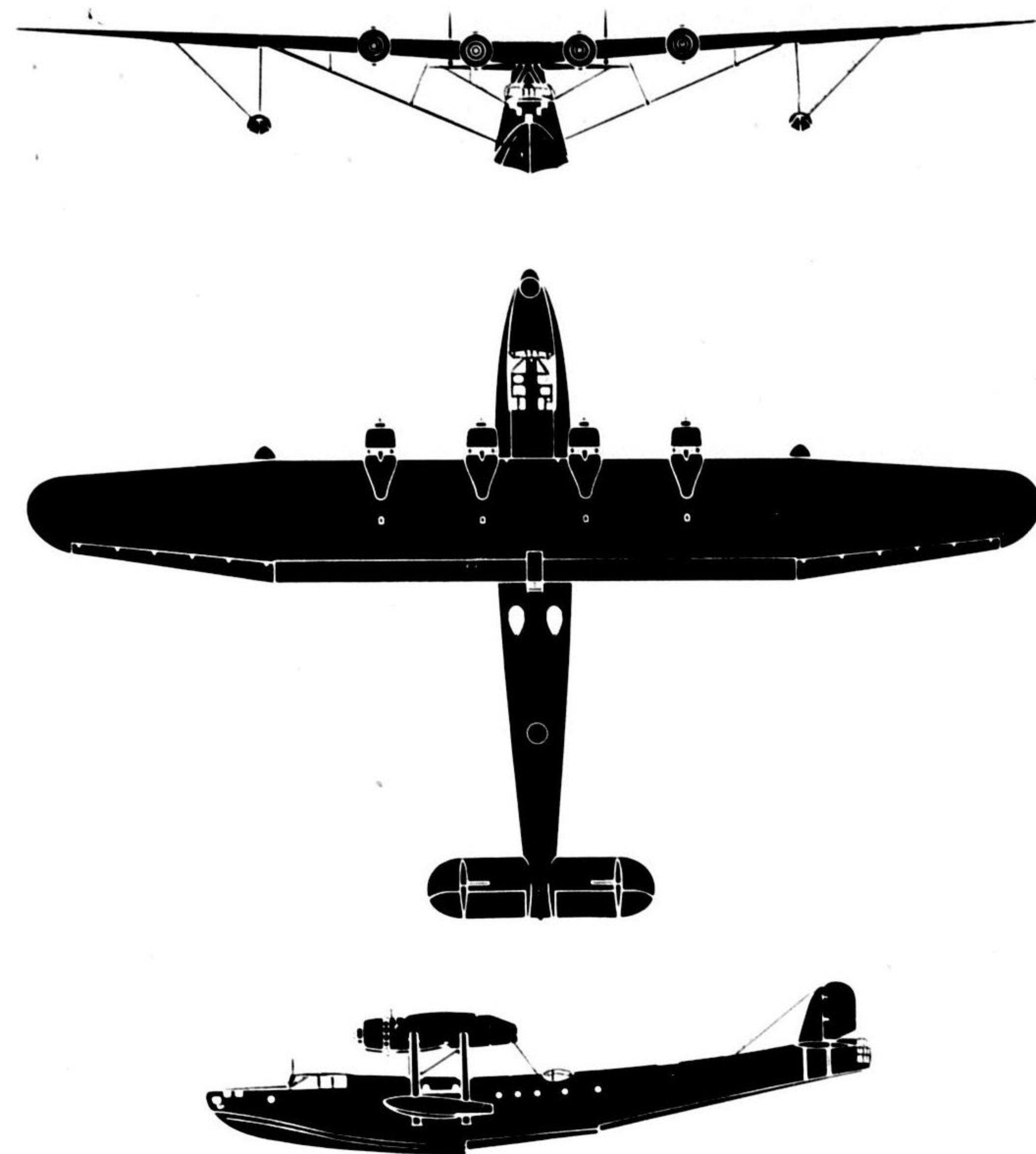
4.01 4.99

SEAPLANES

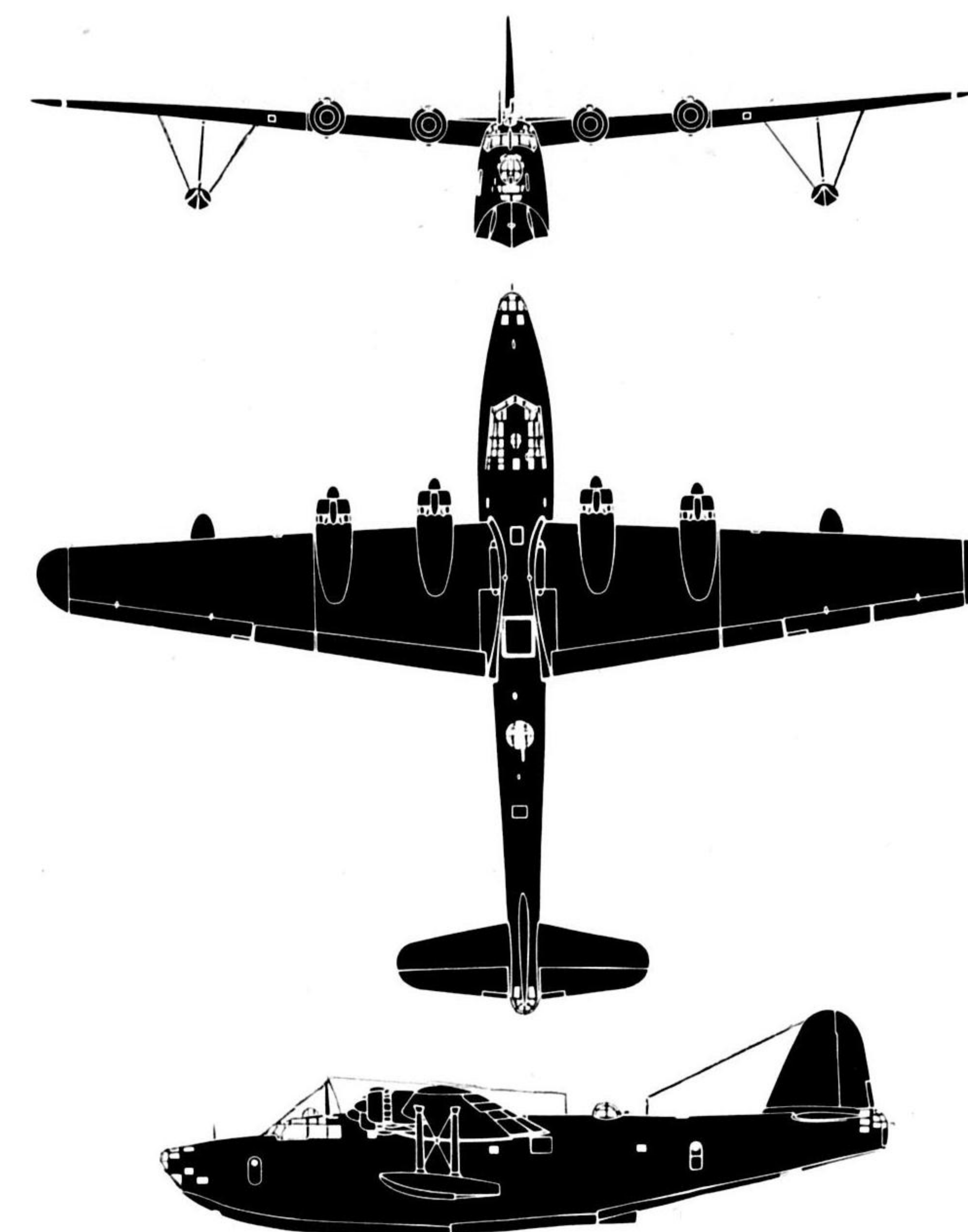
RESTRICTED

SILHOUETTES

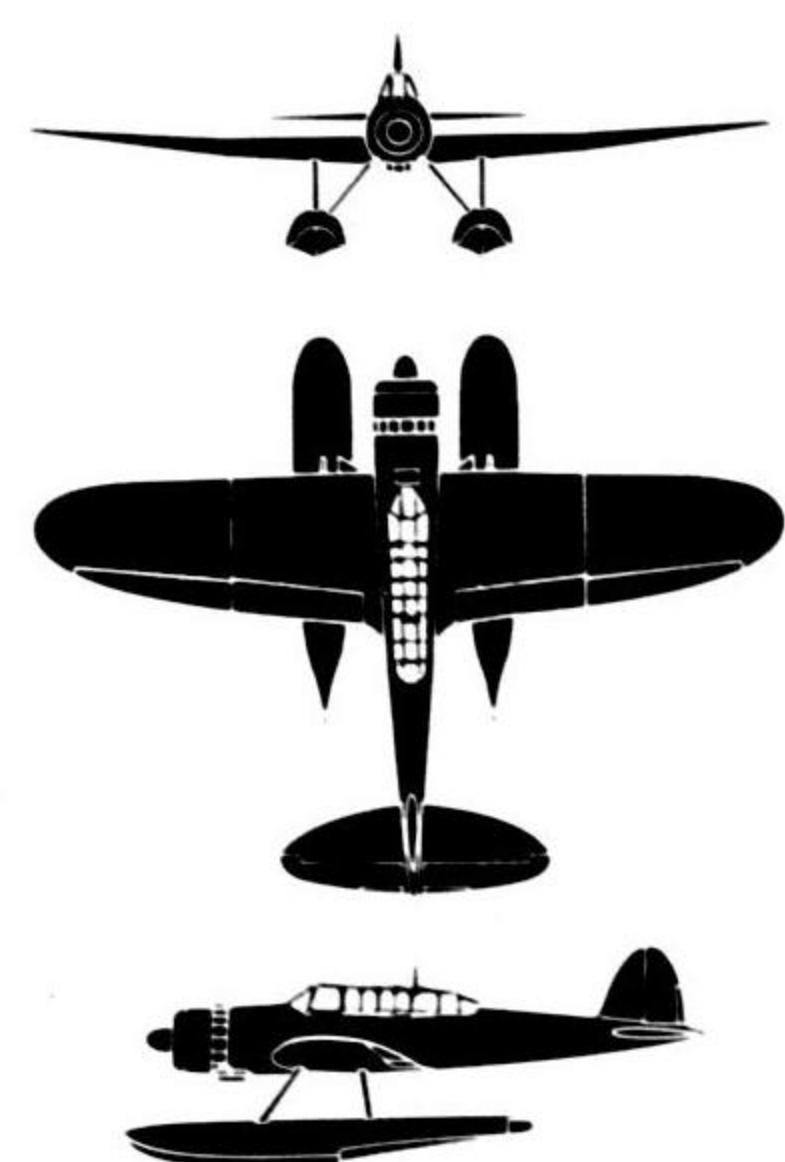
TO SCALE 1" = 40'



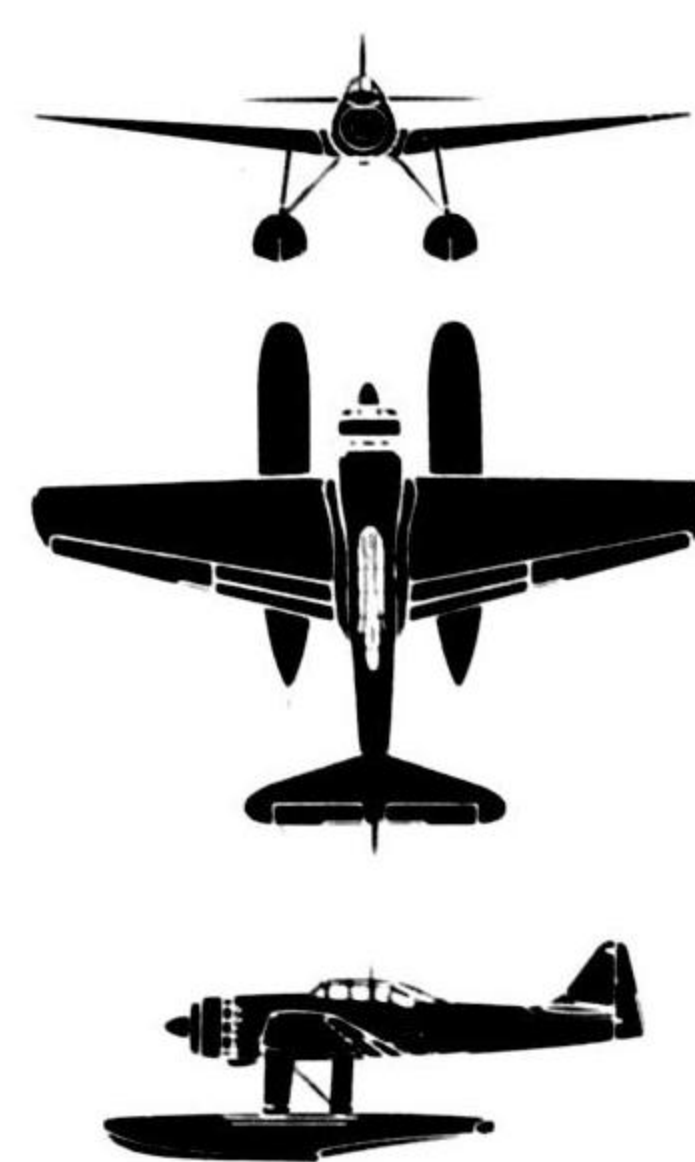
MAVIS 22
Navy Patrol Bomber
S - 131' 4"
L - 84' 1"



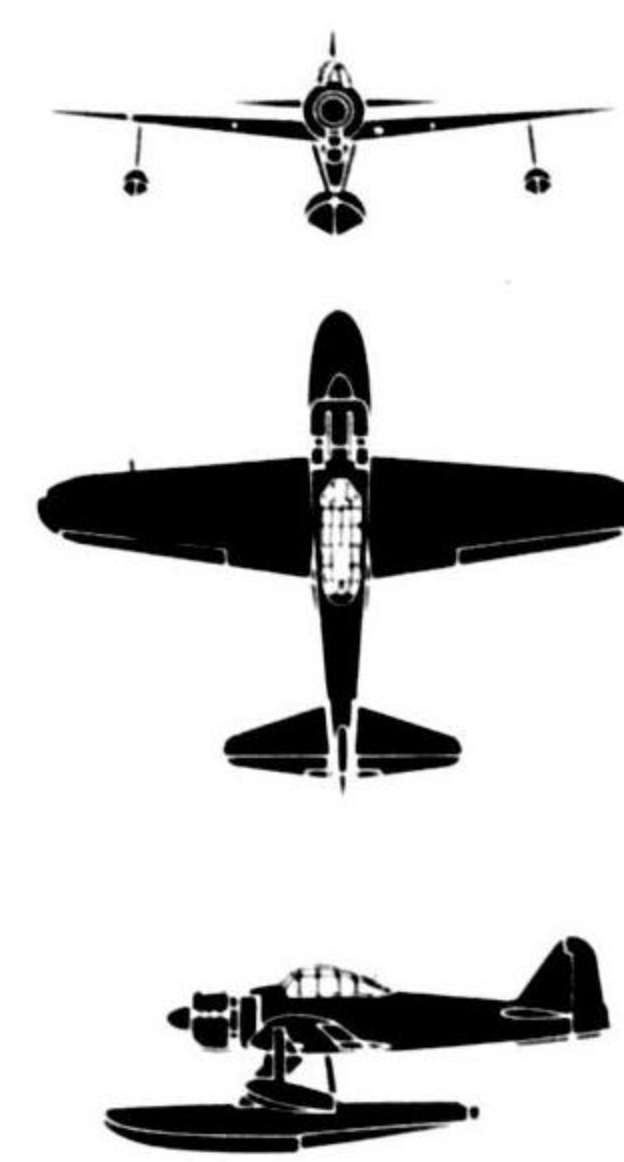
EMILY 22
Navy Patrol Bomber
S - 124' 8"
L - 92' 3"



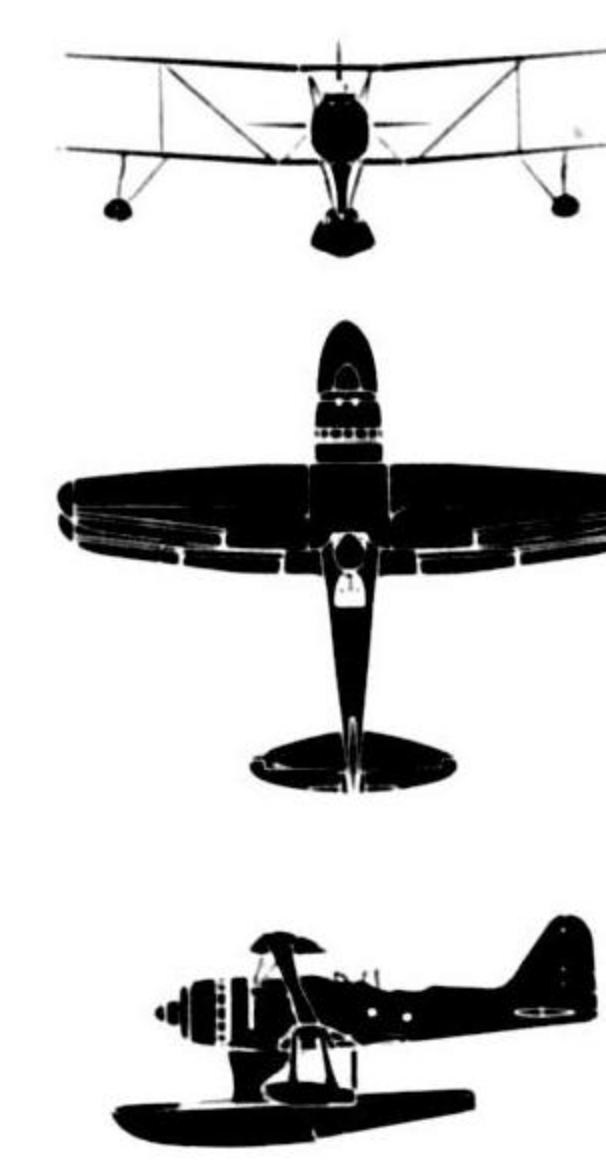
JAKE II
Navy Recce.
S - 46' 10"
L - 37' 3"



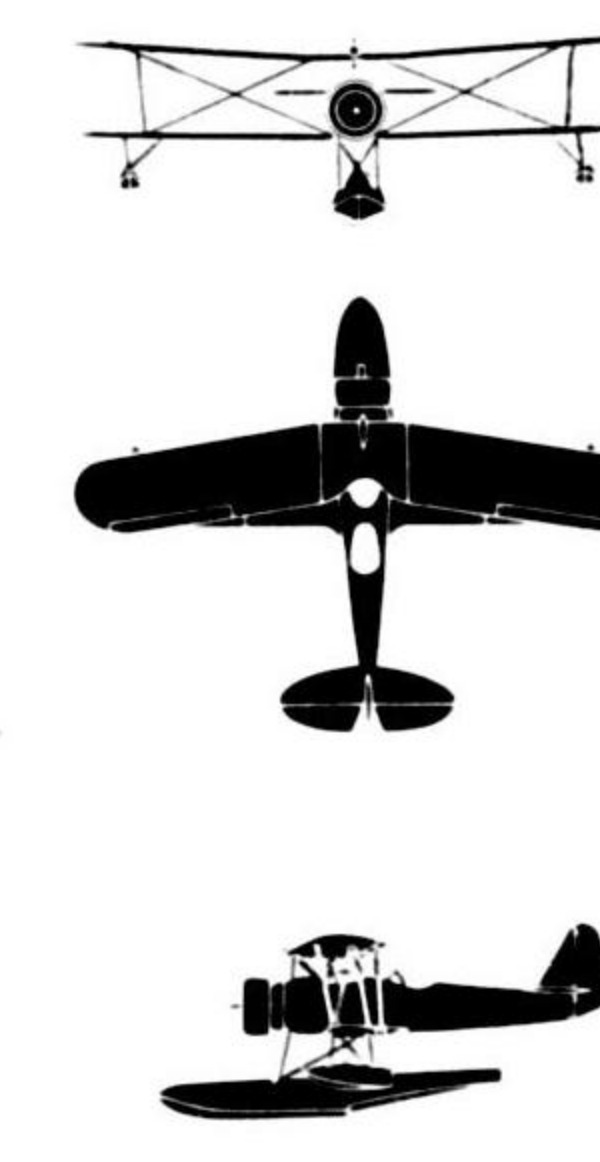
PAUL II
Navy D.B.-R.
S - 42'
L - 35' 7"



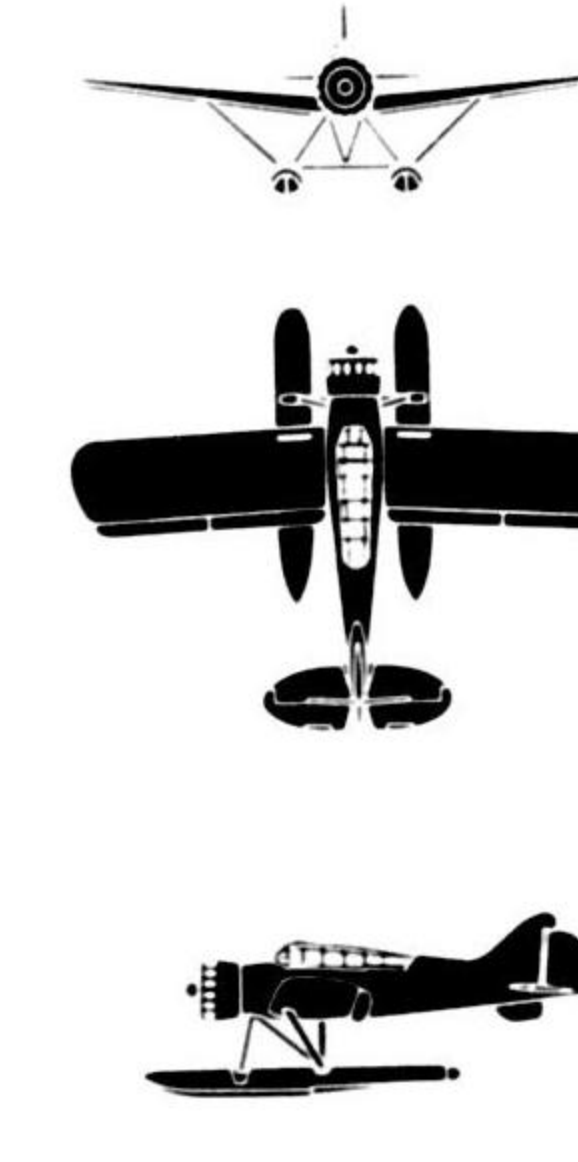
RUFÉ II
Navy Fighter
S - 39' 3"
L - 33' 10"



PETE II
Navy Recce.
S - 36' 1"
L - 31' 1"



DAVE II
Navy Recce.
S - 36'
L - 28' 4"



GLEN II
Navy Recce.
S - 36'
L - 28'

"MAVIS"

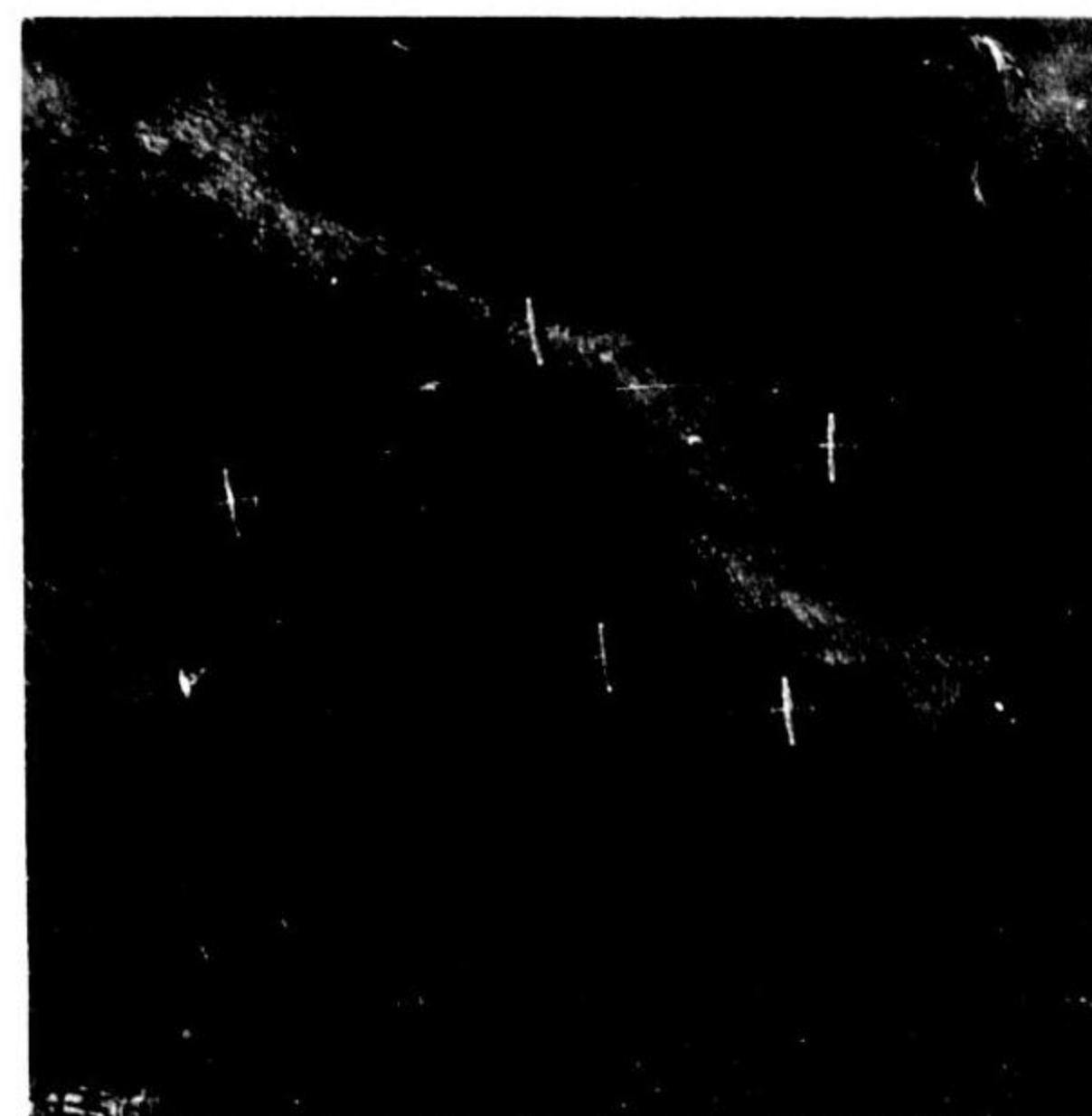
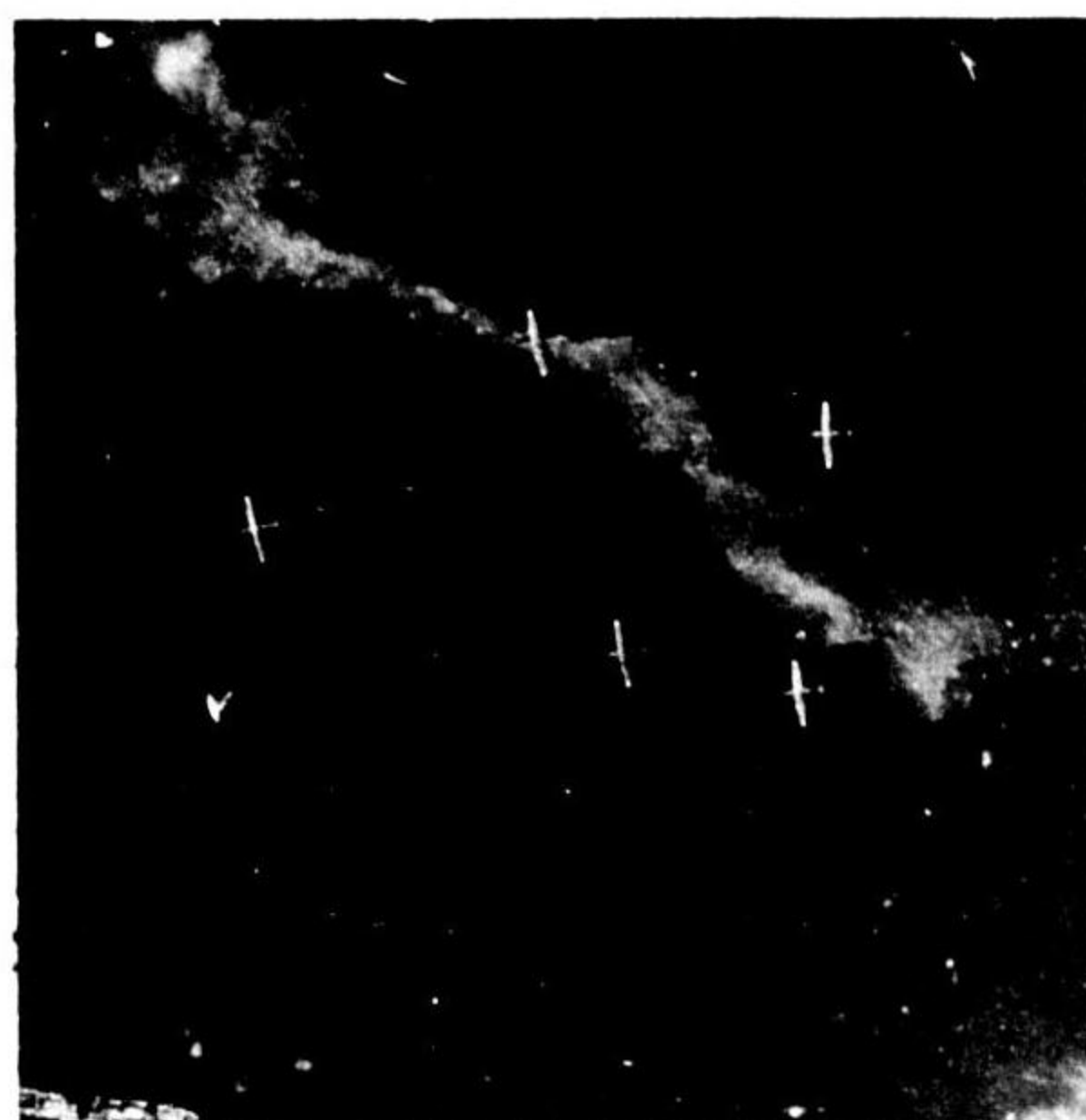


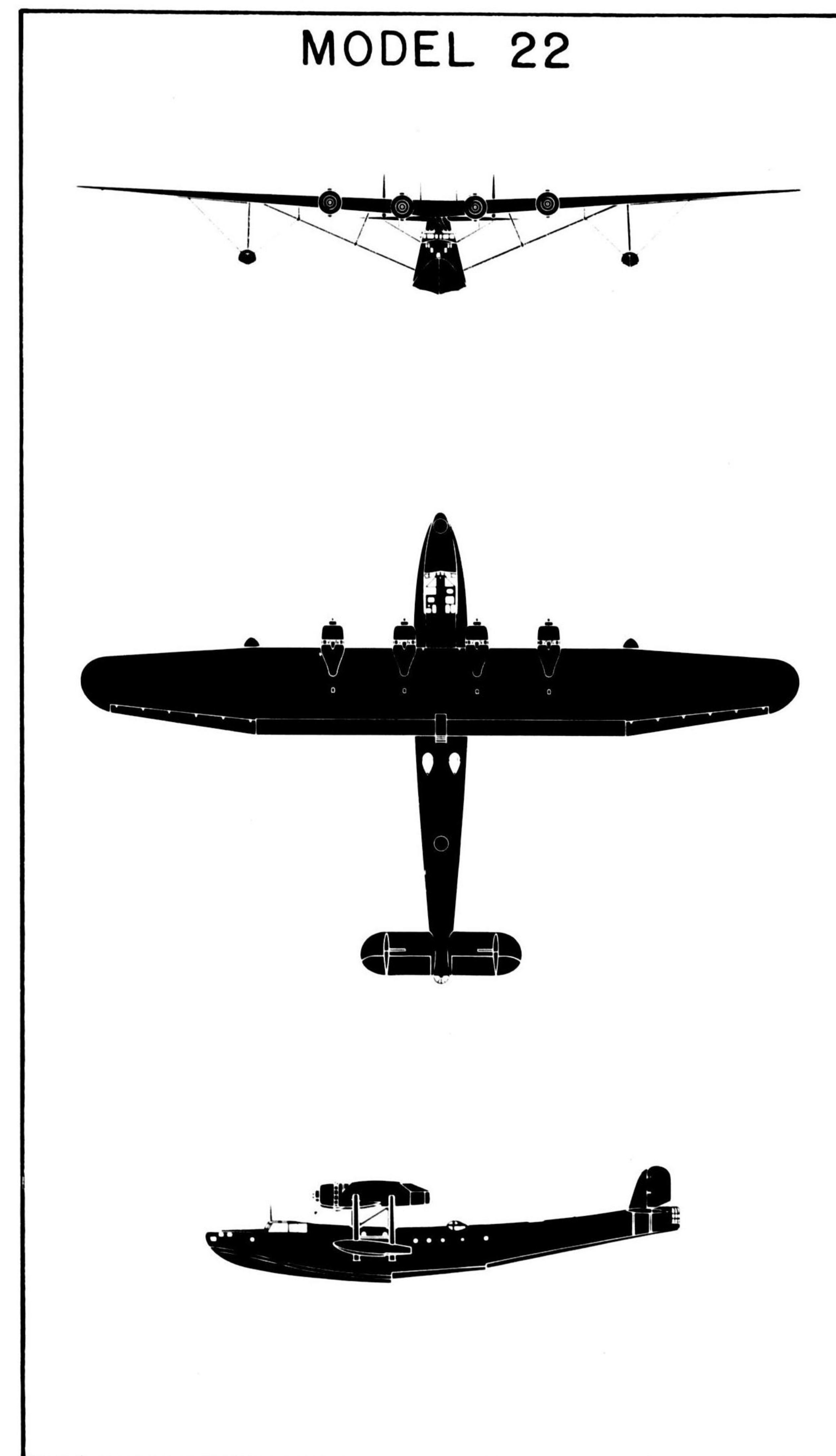
Photo Scale 1:12,505

Identification Data

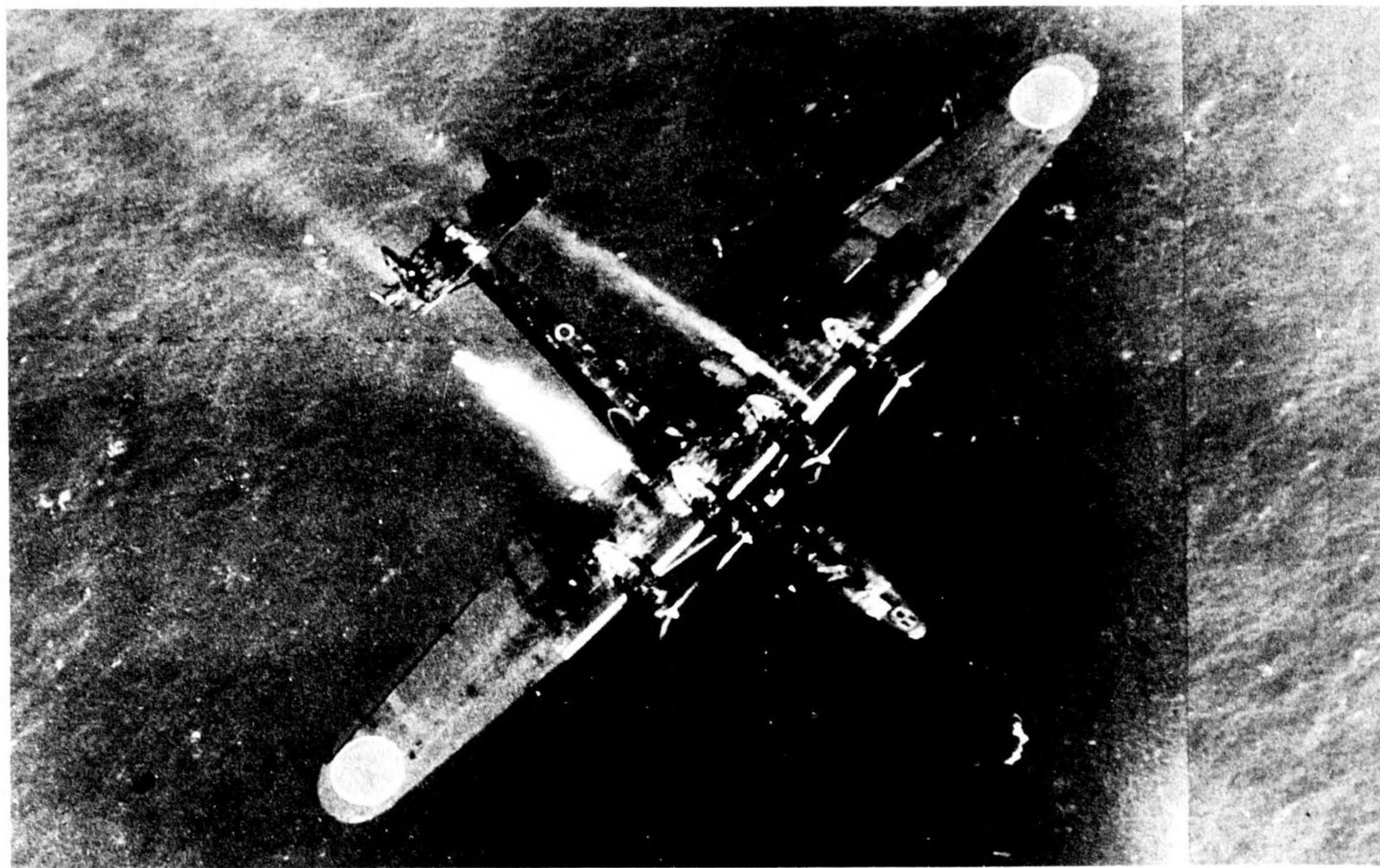
- Four-engine flying-boat.
- Parasol wing set well forward on fuselage.
- Center sections of leading and trailing edges of wing are straight, outer panels taper to rounded tips.
- Twin fins and rudders set on tailplane having straight leading and trailing edges, rounded tips.
- Two inboard engines set in close to fuselage.
- Noticeable tail turret projects aft of tailplane.
- Twin stabilizing floats outboard of engine.

MAVIS is also used for torpedo bombing, horizontal bombing and as a transport.

- KAWANISHI 97
- PATROL BOMBER
- S - 131' 4"
- L - 84' 1"



MAVIS



MAVIS is best distinguished from a similar flying boat, EMILY, by its twin fins and rudders. EMILY has a single fin and rudder. Note in the stereo below, however, how the projection of the fuselage above the surface of the tailplane might easily be mistaken for a single fin and rudder if the true fins and rudders are not noticeable.

The parallel-sided wing of MAVIS differs noticeably from the tapered wing of EMILY. Moreover, MAVIS has a parasol wing while EMILY has a high-wing construction. The fuselage nose on EMILY projects further forward of the wing than it does on MAVIS.

CHERRY is a flying boat rarely reported which closely resembles MAVIS, though of smaller size. CHERRY has only two engines and its span is about twenty-five feet shorter than the span of MAVIS. Both planes have a parasol wing of similar shape set well forward on the fuselage and twin fins and rudders set inboard on a parallel-sided tailplane.

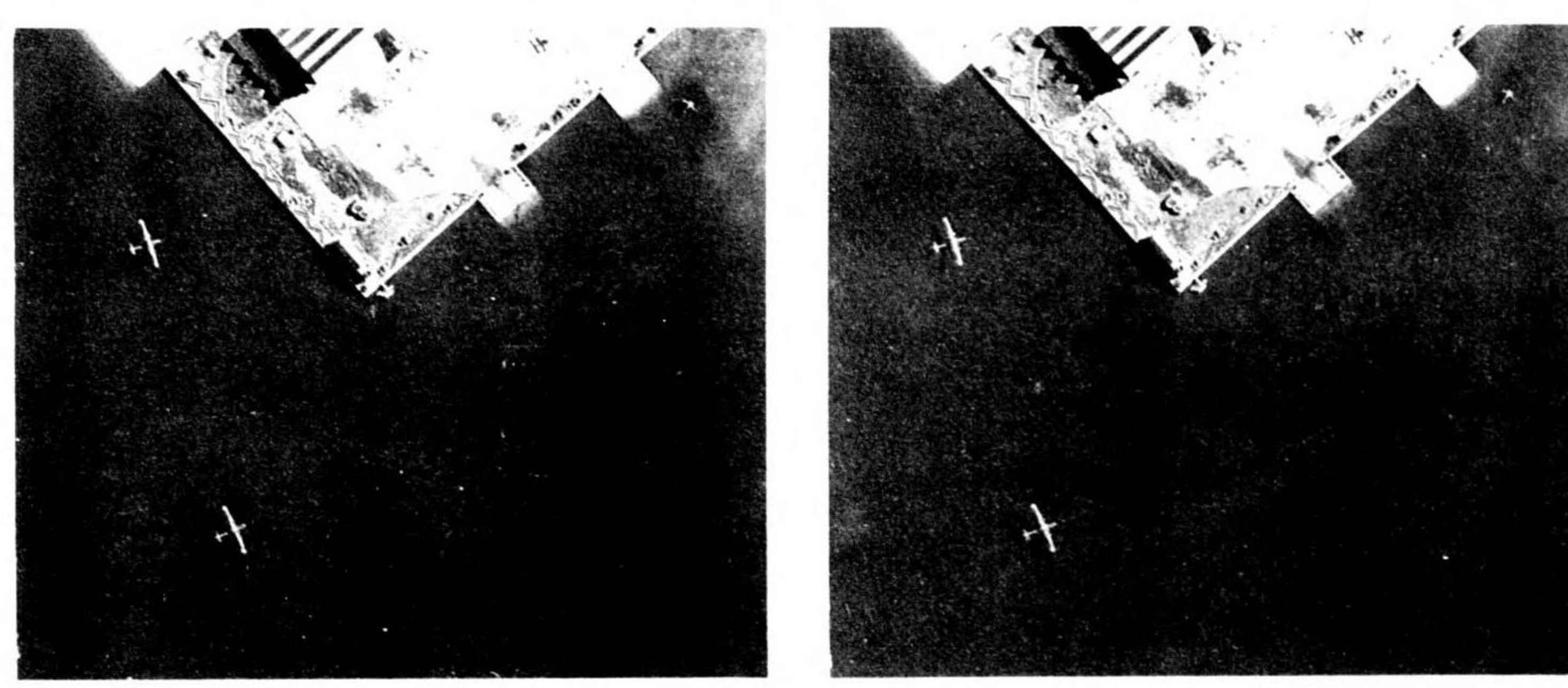


Photo Scale 1:10,100

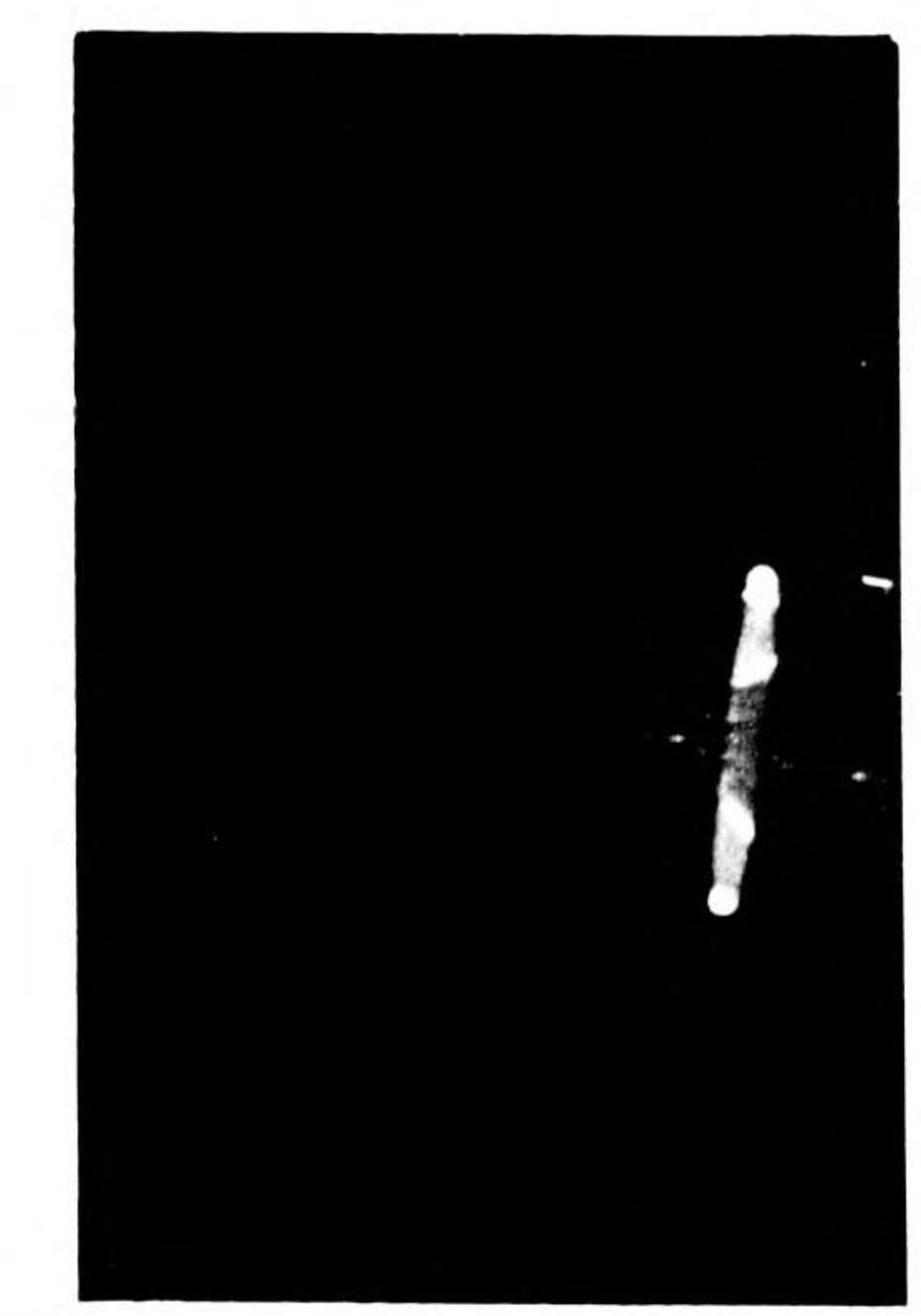


Photo Scale 1:2285

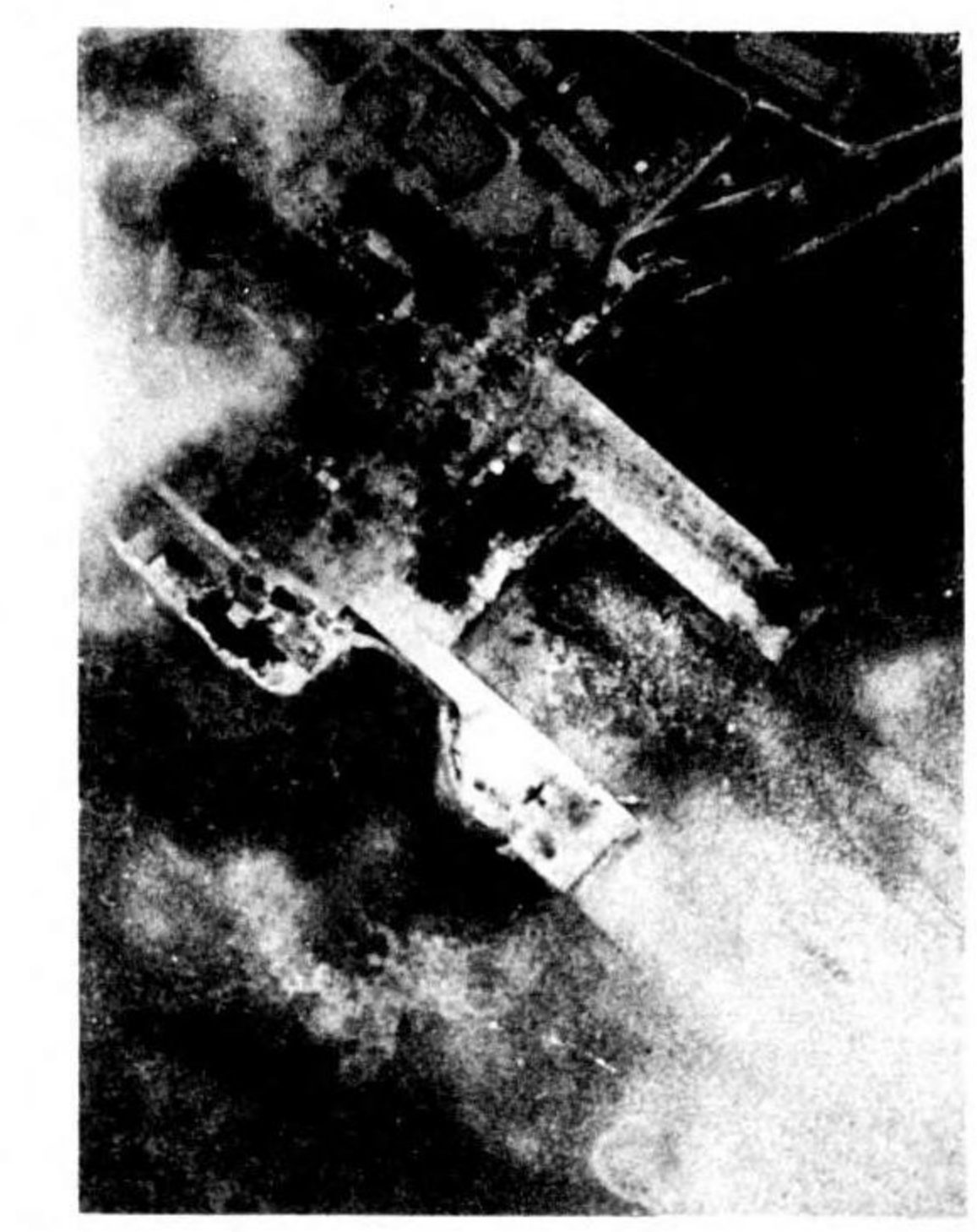


Photo Scale 1:9850

Above are five MAVIS', three EMILY's and four JAKE's. Below are three MAVIS', four EMILY's and two JAKE's. Note the differences in the two flying boats.



Photo Scale 1:6000

"EMILY"

- KAWANISHI 02
- PATROL BOMBER
- S - 124' 8"
- L - 92' 3"

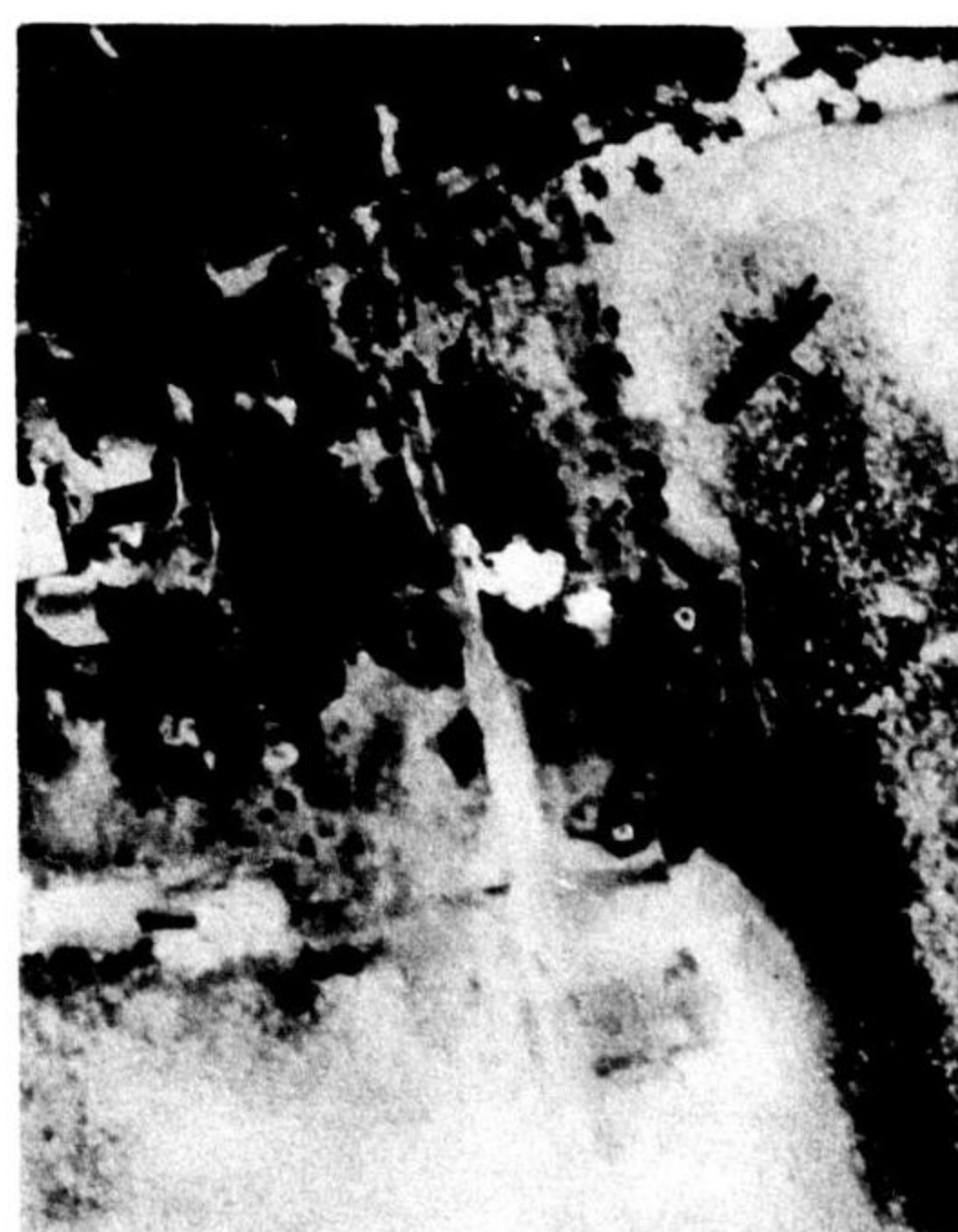


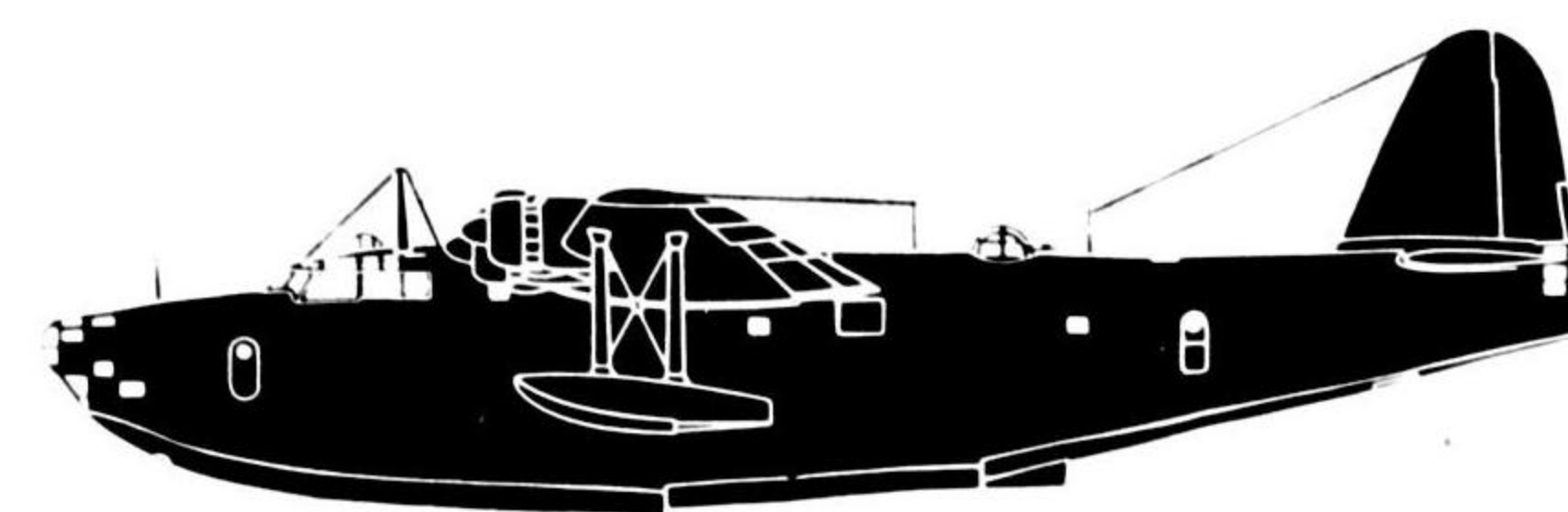
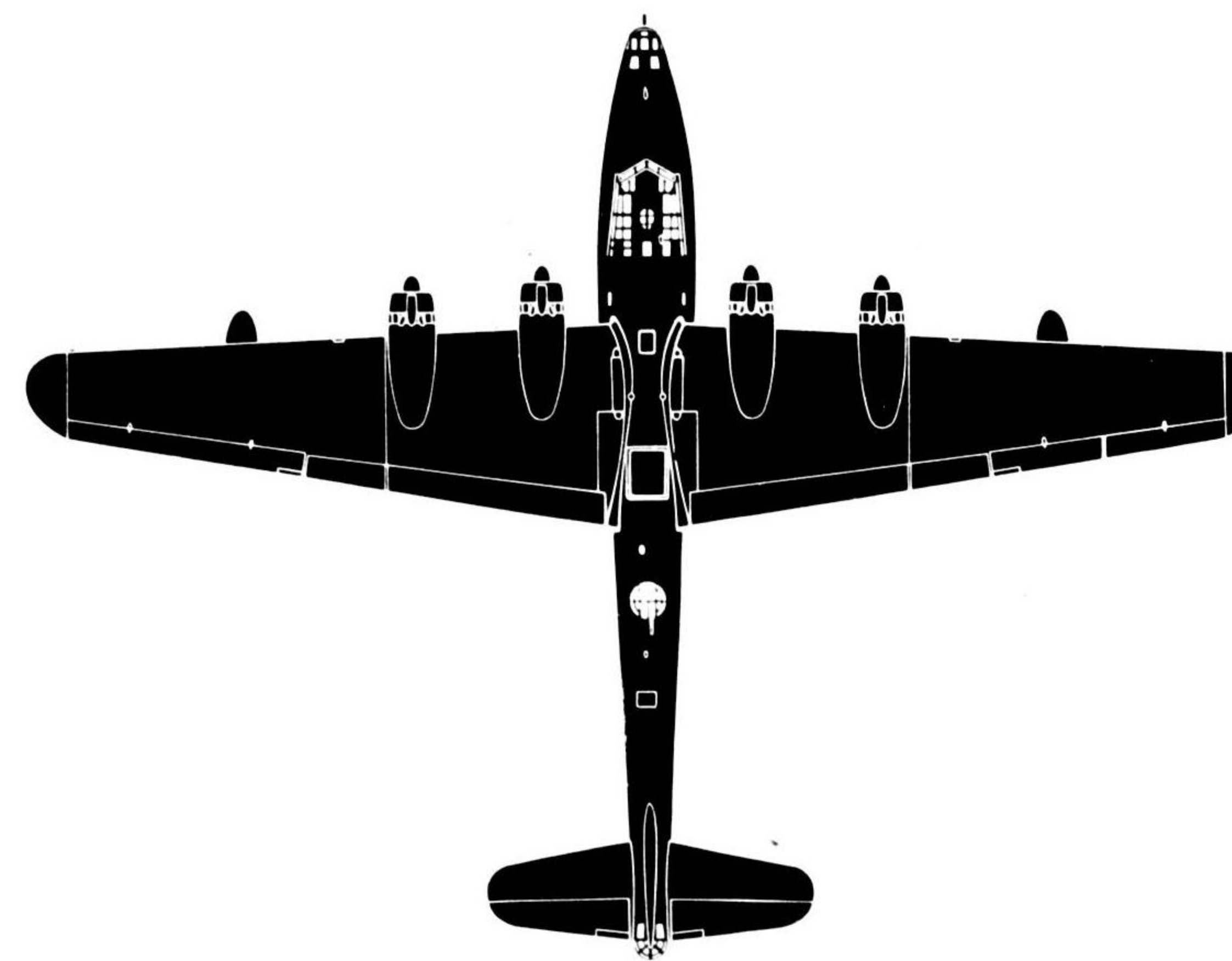
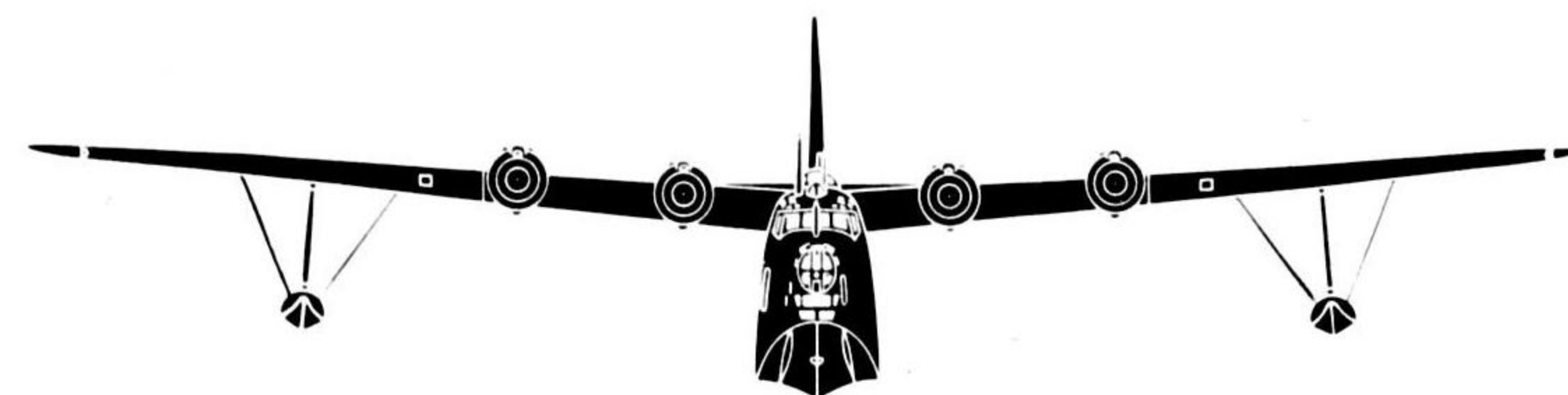
Photo Scale 1:4860

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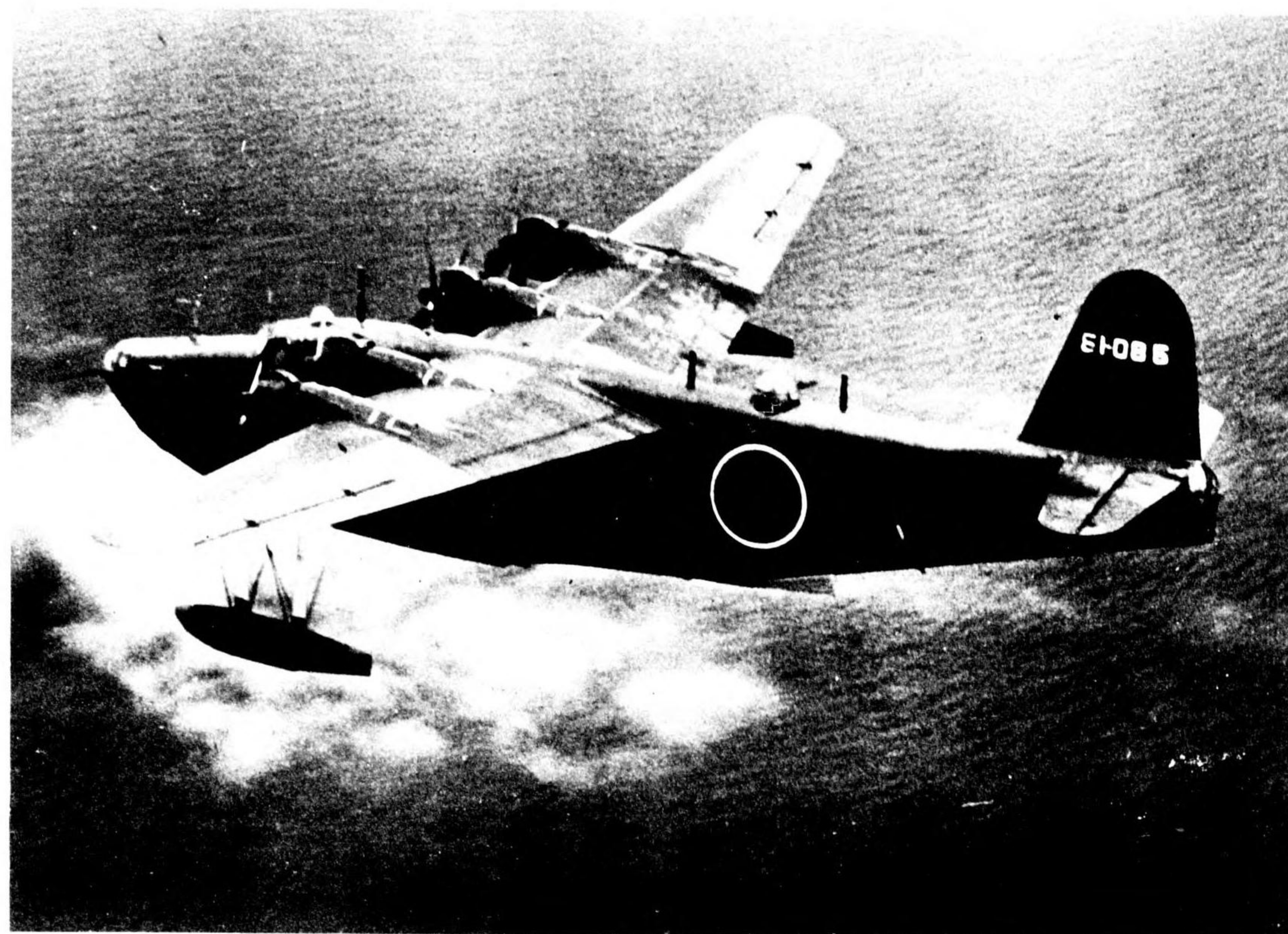
- Four-engine flying-boat with deep hull.
- High wing set well back on fuselage.
- Wing has even, moderate taper and rounded tips.
- Single fin and rudder set on tailplane of even taper, rounded tips.
- Twin stabilizing floats outboard of engines.

EMILY is also used for torpedo bombing, horizontal bombing and transport work.

MODEL 22

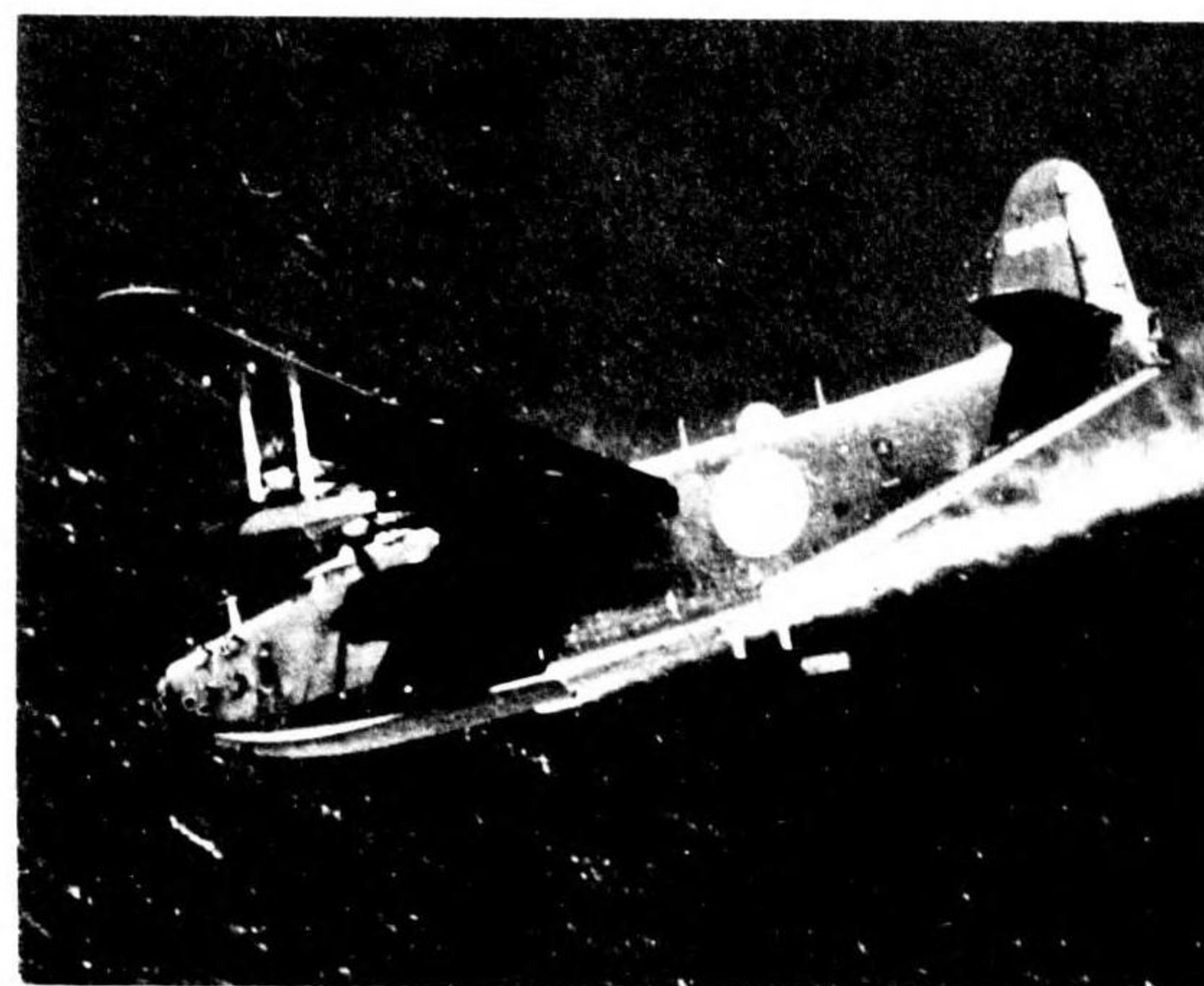
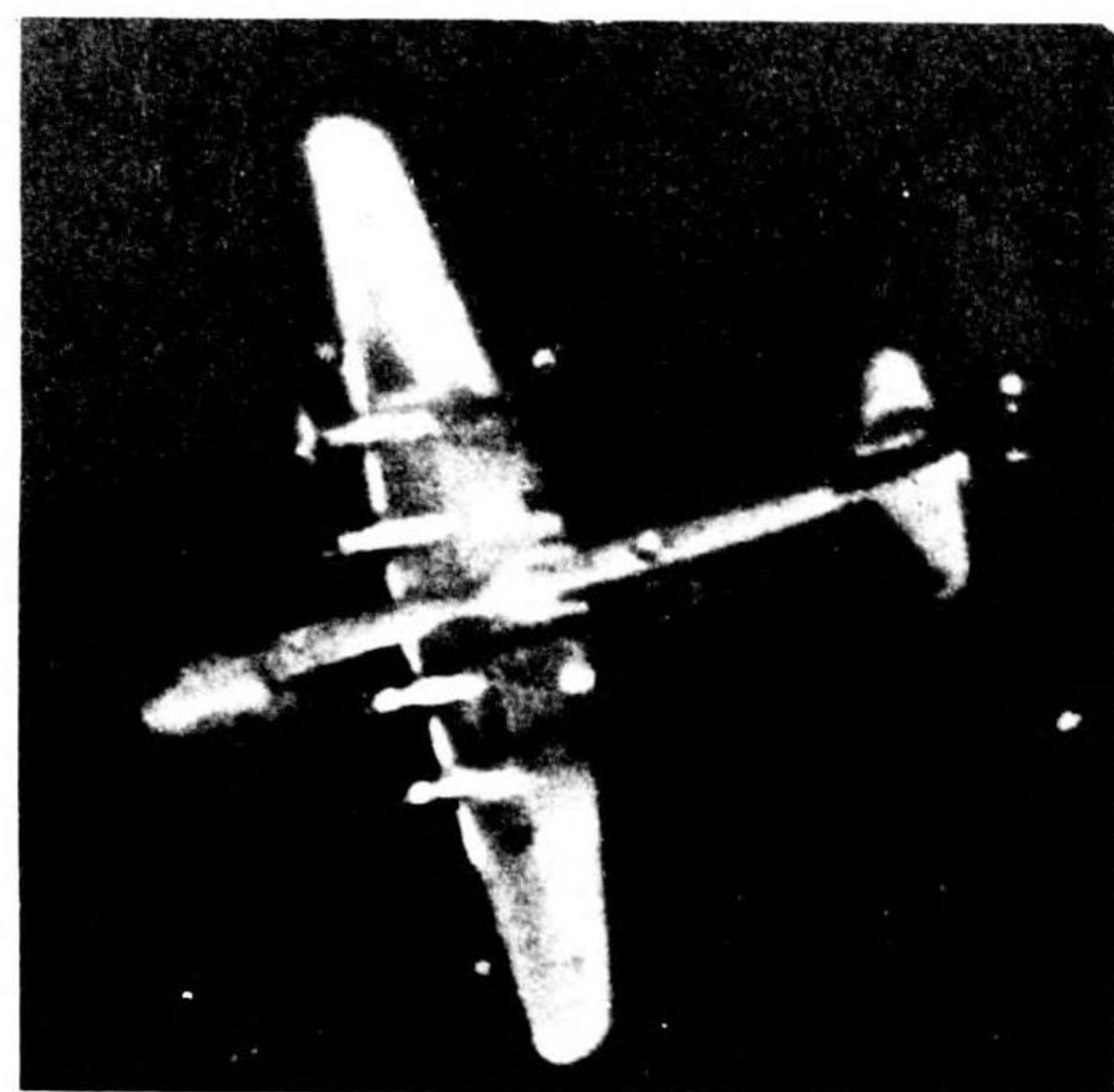


EMILY



EMILY with its clean-cut lines is fast replacing the lumbering, awkward-looking MAVIS for most patrol work. In the combat photos shown above and below note the streamlined wing and fuselage, the dorsal turret and the tail-gun position. Radar dipoles can be seen projecting from the side of the fuselage nose and from the side of the fuselage just forward of the tailplane.

To distinguish EMILY from MAVIS see page 4.03.



R E S T R I C T E D



Photo Scale 1:9850

Four EMILY's, three MAVIS' and eight JAKE's above.

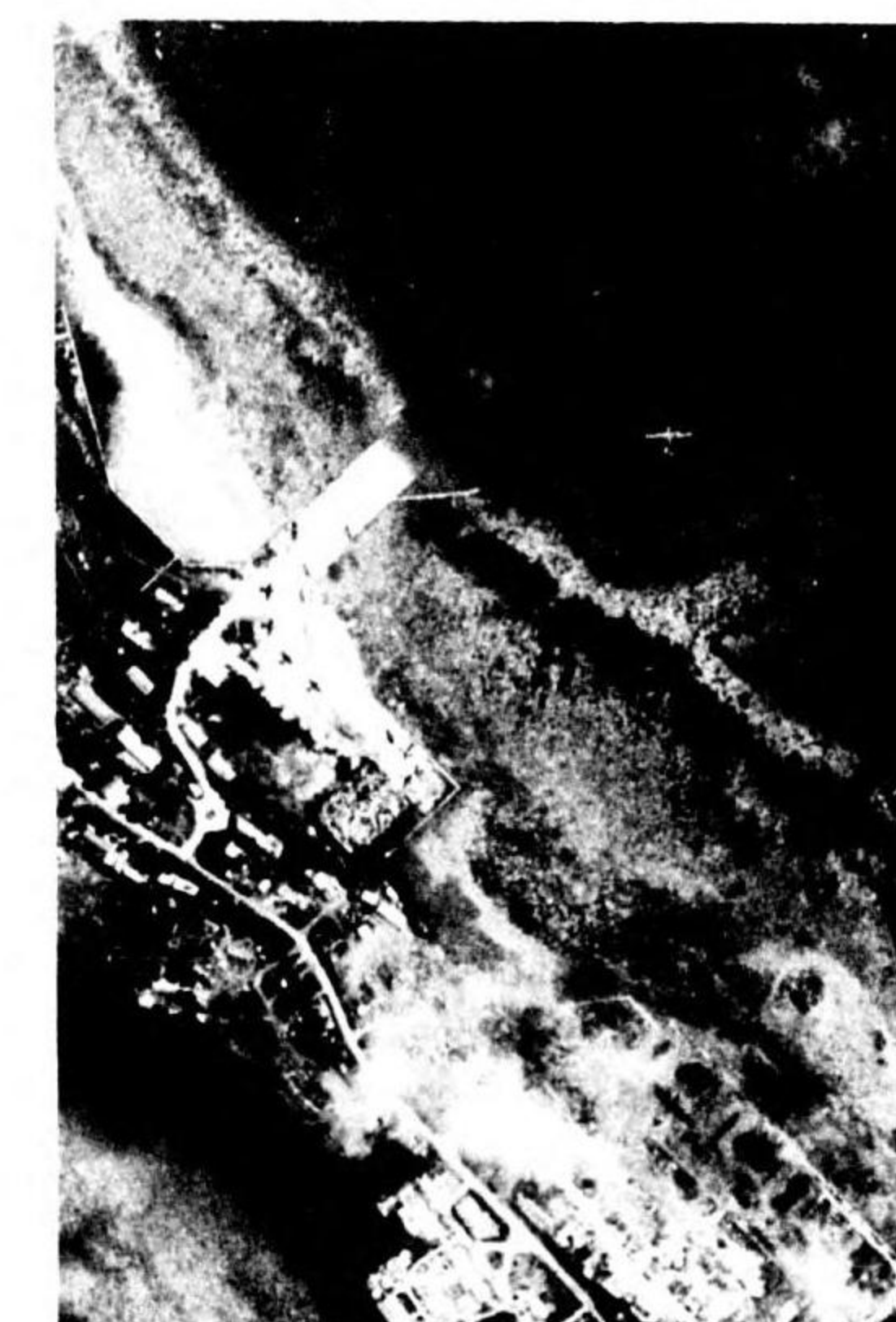


Photo Scale 1:15,755

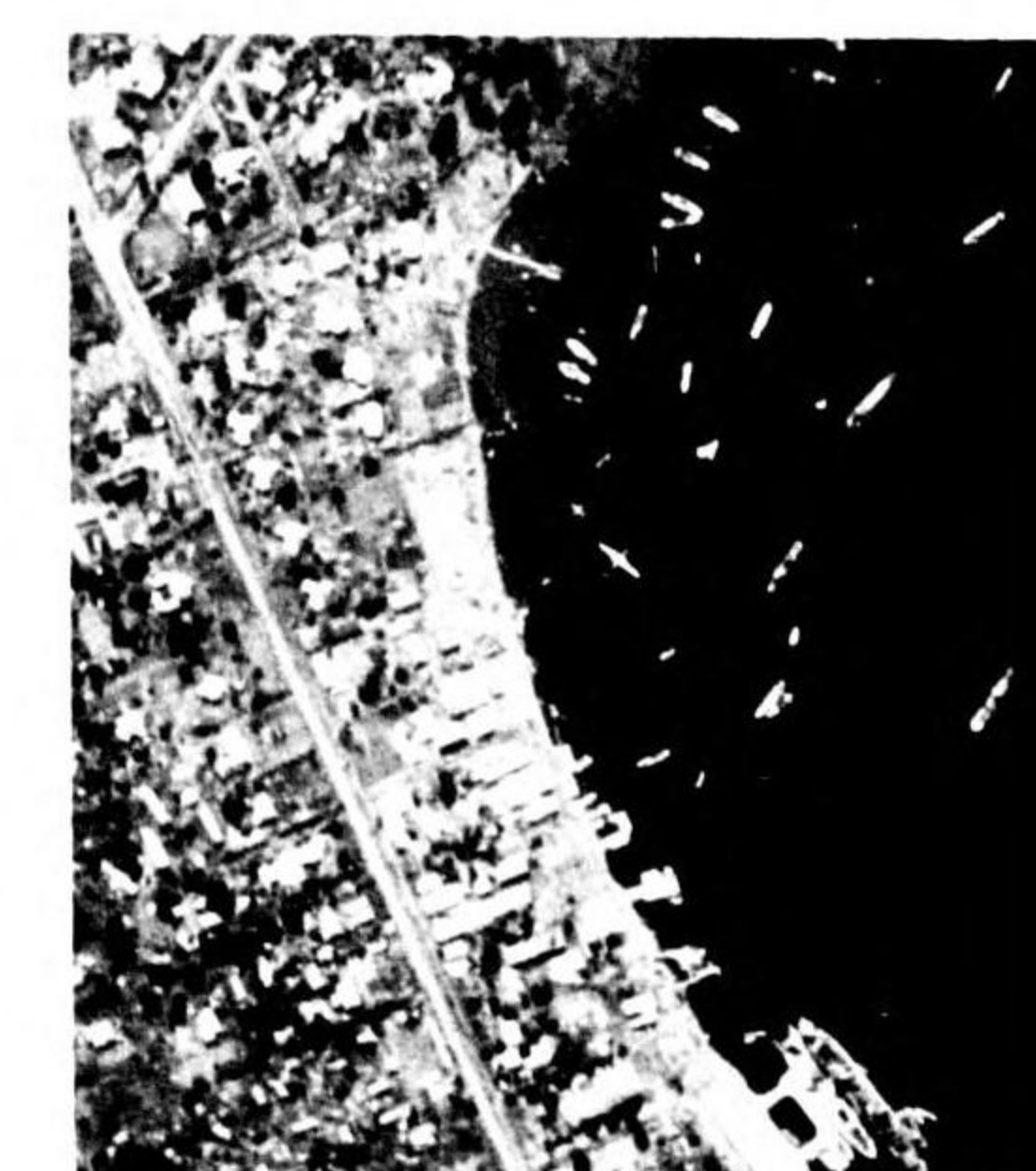
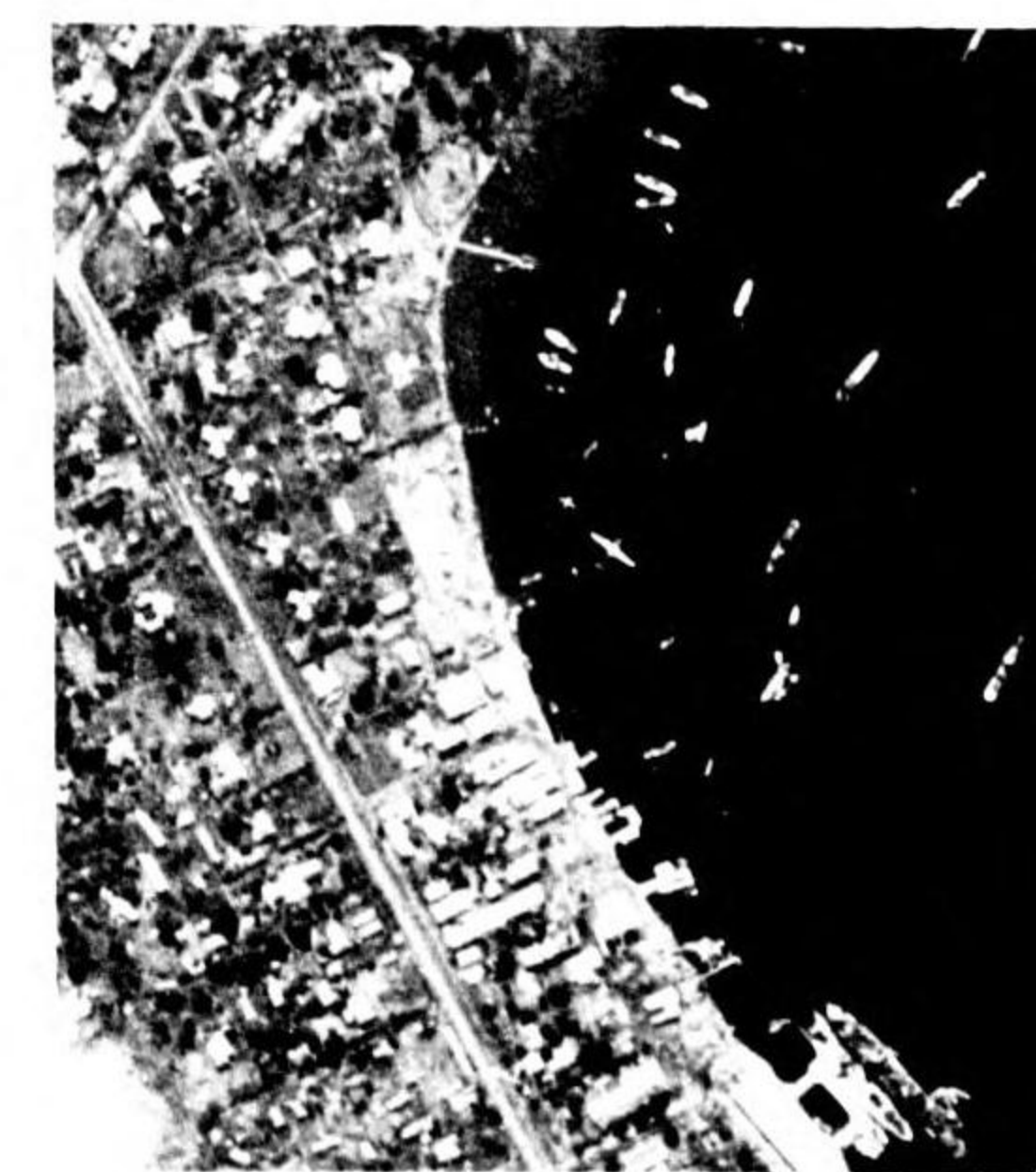


Photo Scale 1:16,280

"JAKE"

- WATANABE OO
- RECONNAISSANCE
- S - 46' 9"
- L - 37' 2"

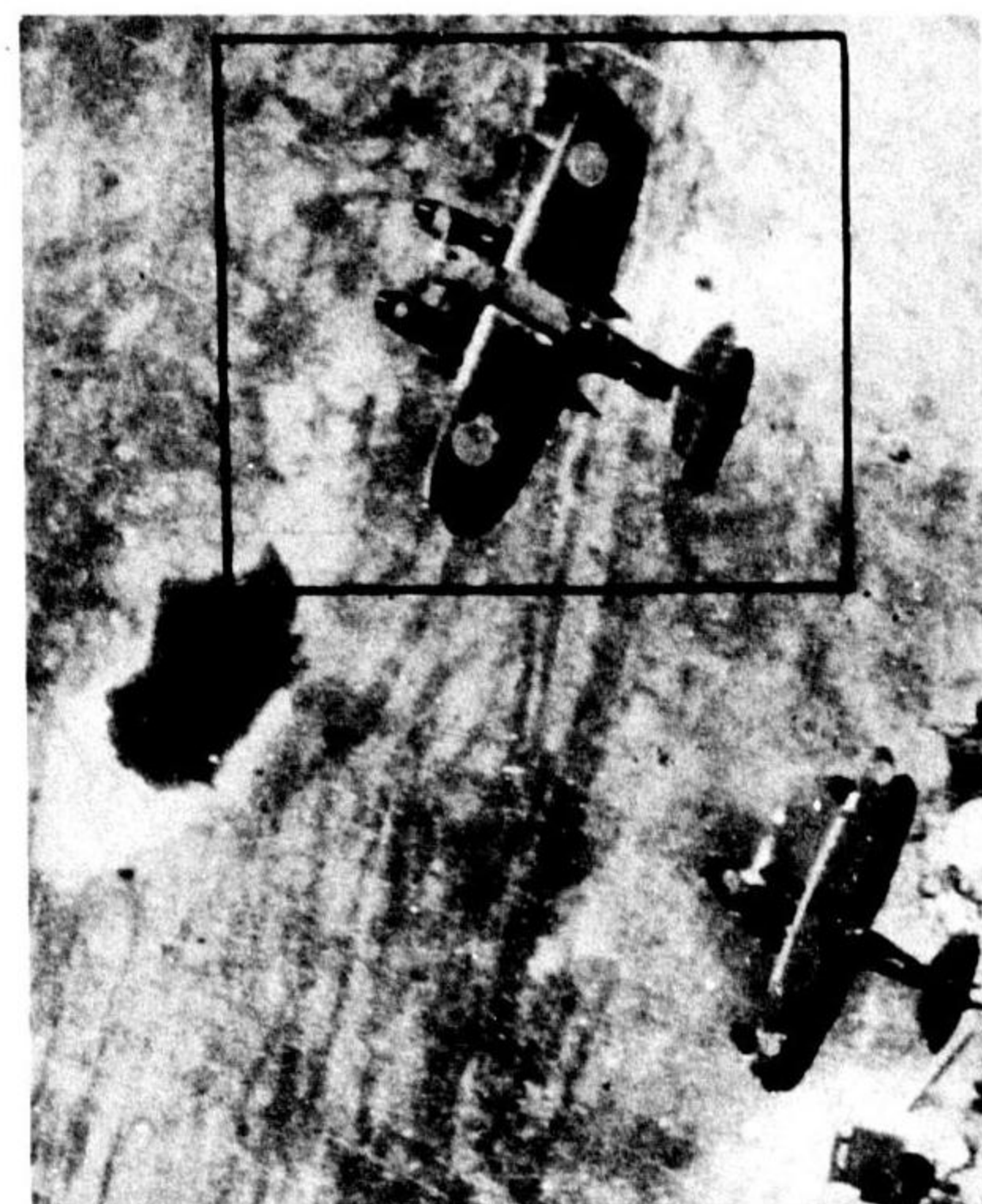
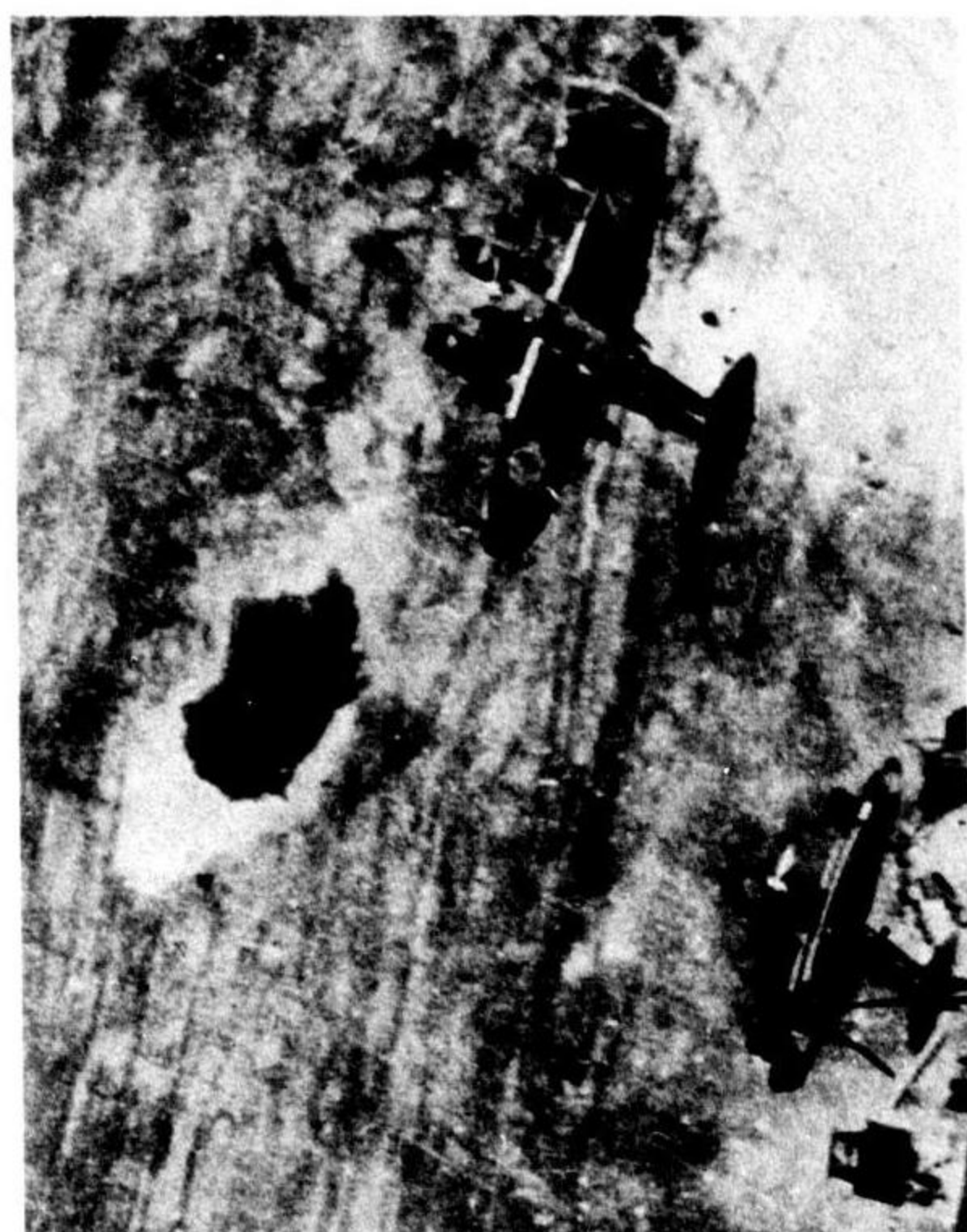
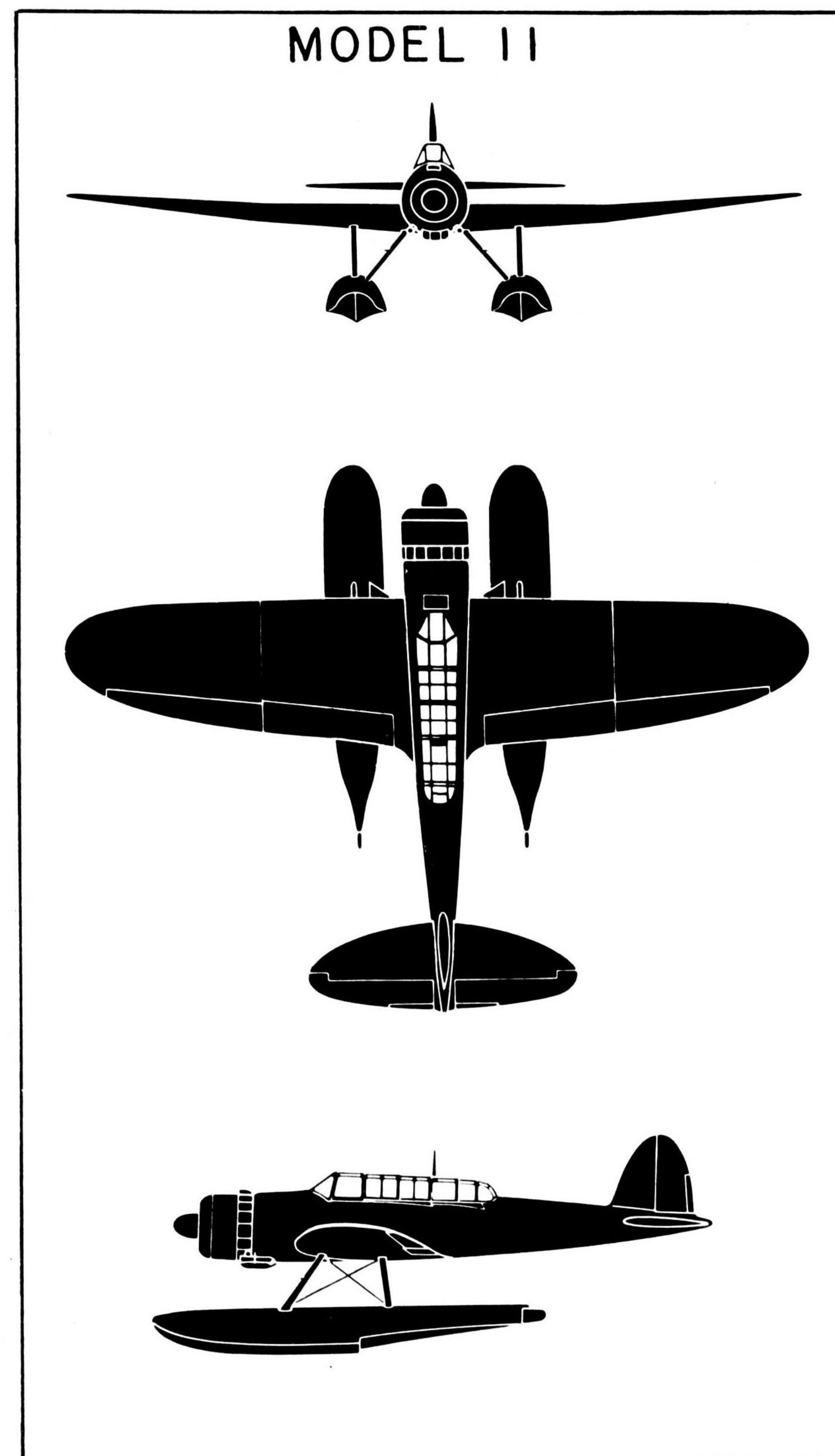


Photo Scale 1:620

Identification Data

- Low-wing, twin-float monoplane.
- Leading edge of wing straight, trailing edge elliptical, rounded and cutback wing tips.
- Radial engine projects forward of wing nearly to tips of floats.
- Semi-elliptical tailplane.
- Long greenhouse.
- Wings fold upward and inward.

JAKE is also used as a light bomber.



JAKE

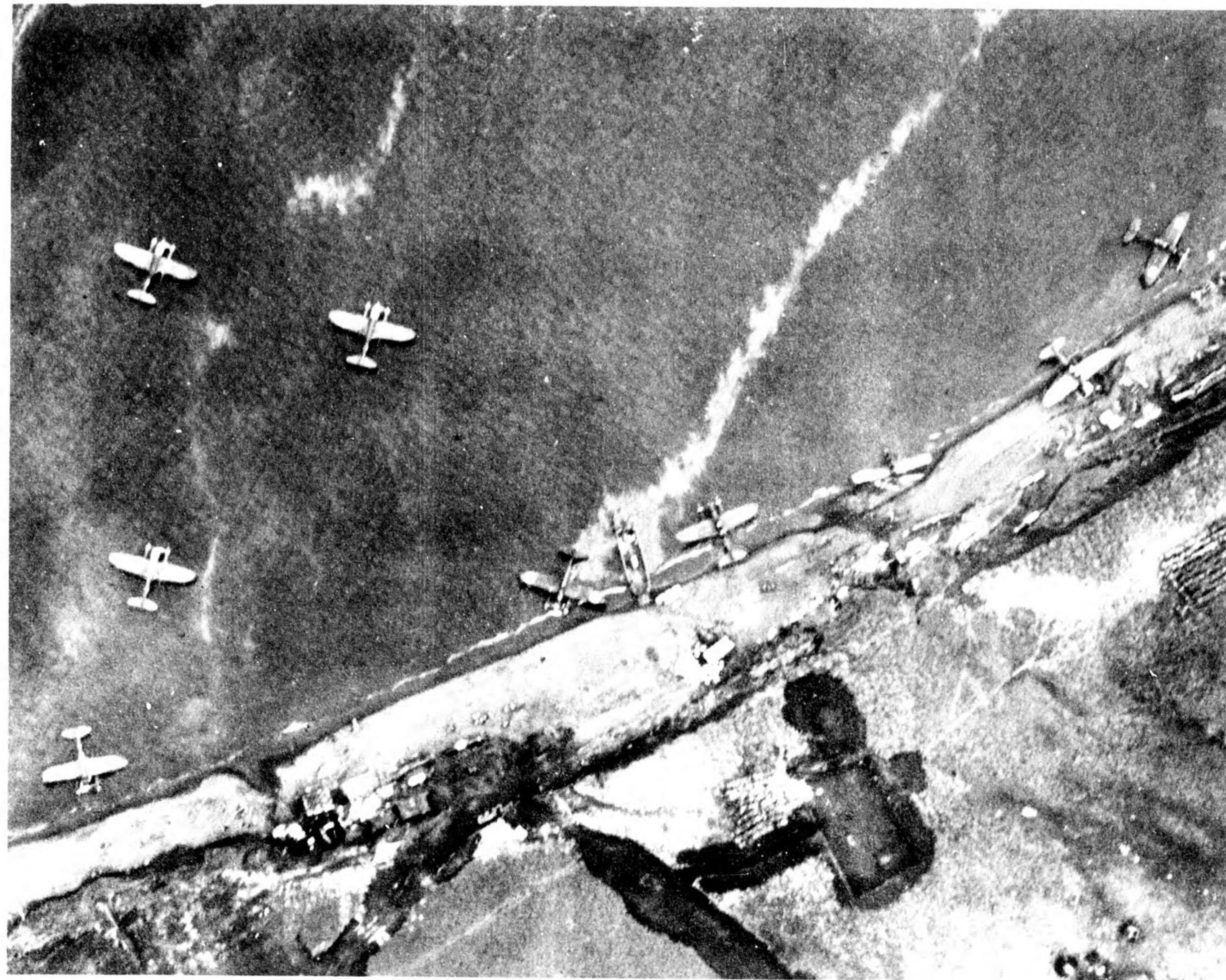


Photo Scale 1:1310



Photo Scale 1:7135

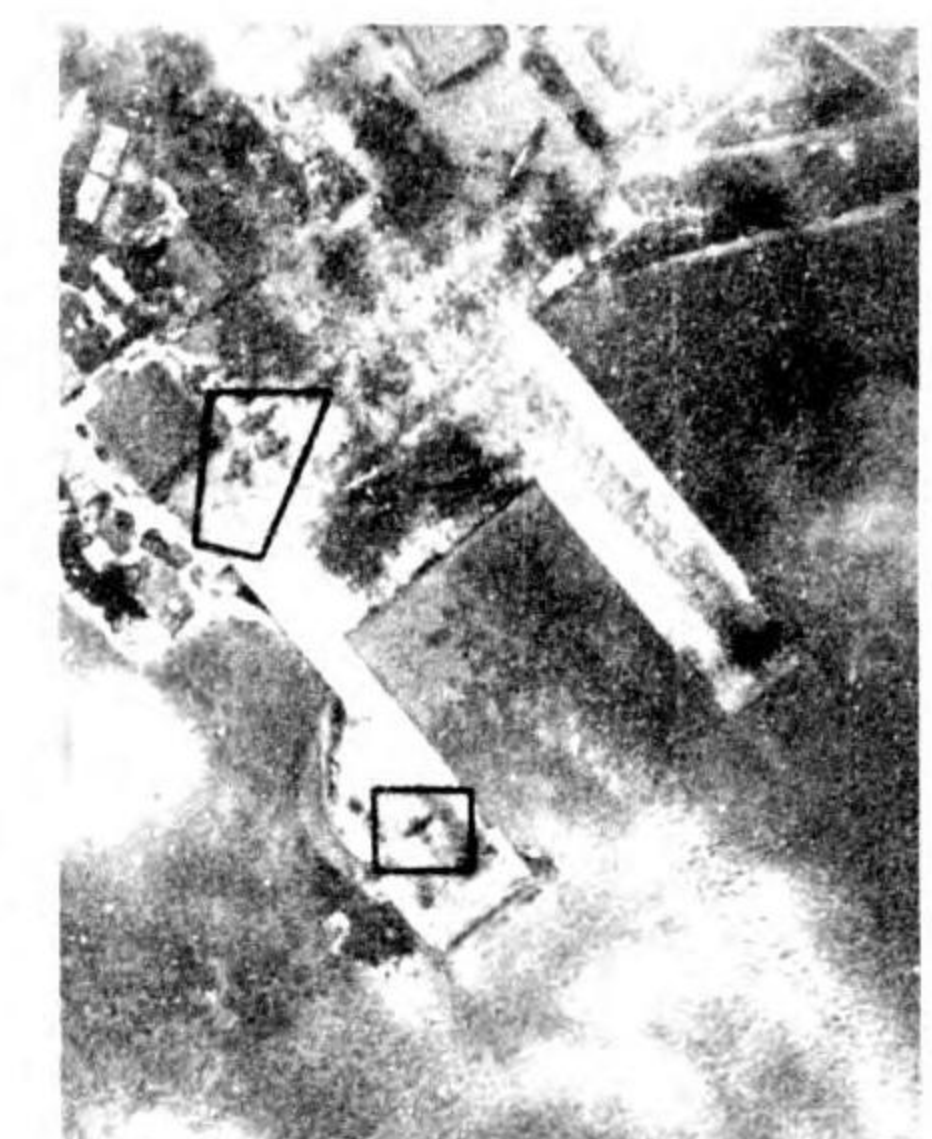
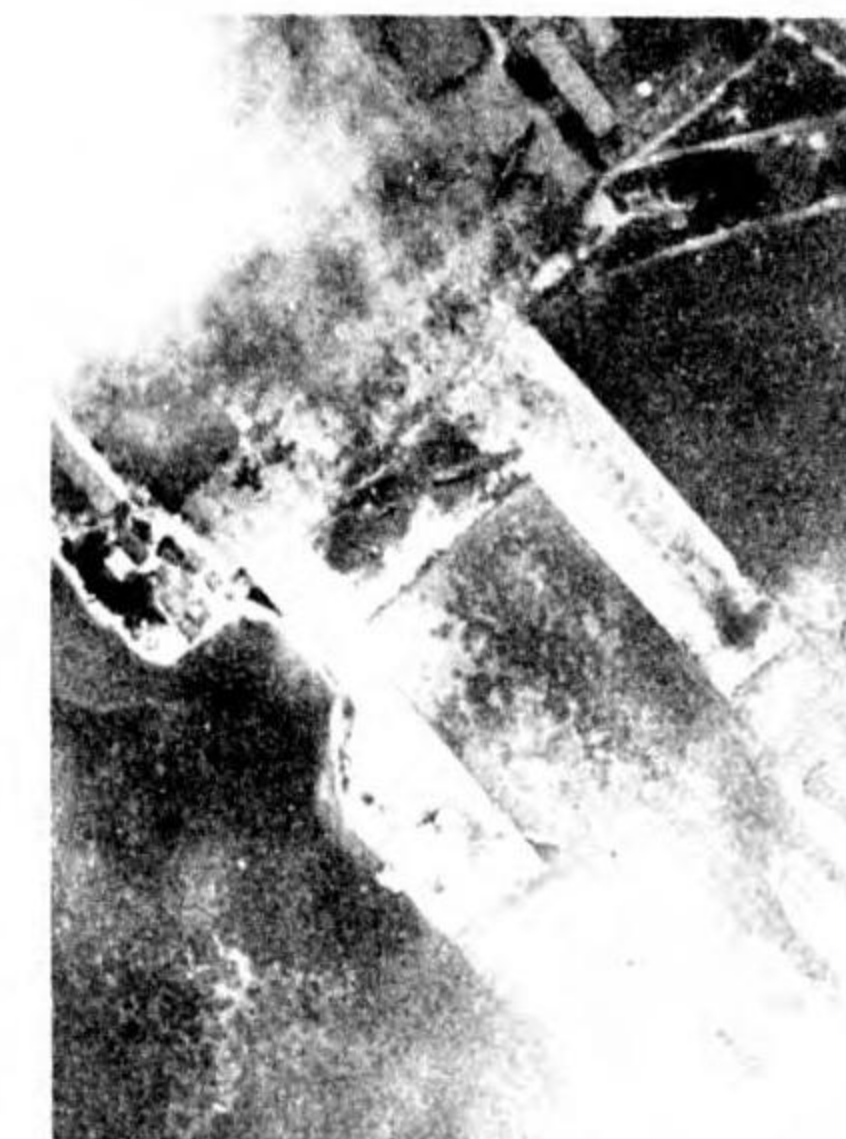


Photo Scale 1:9870

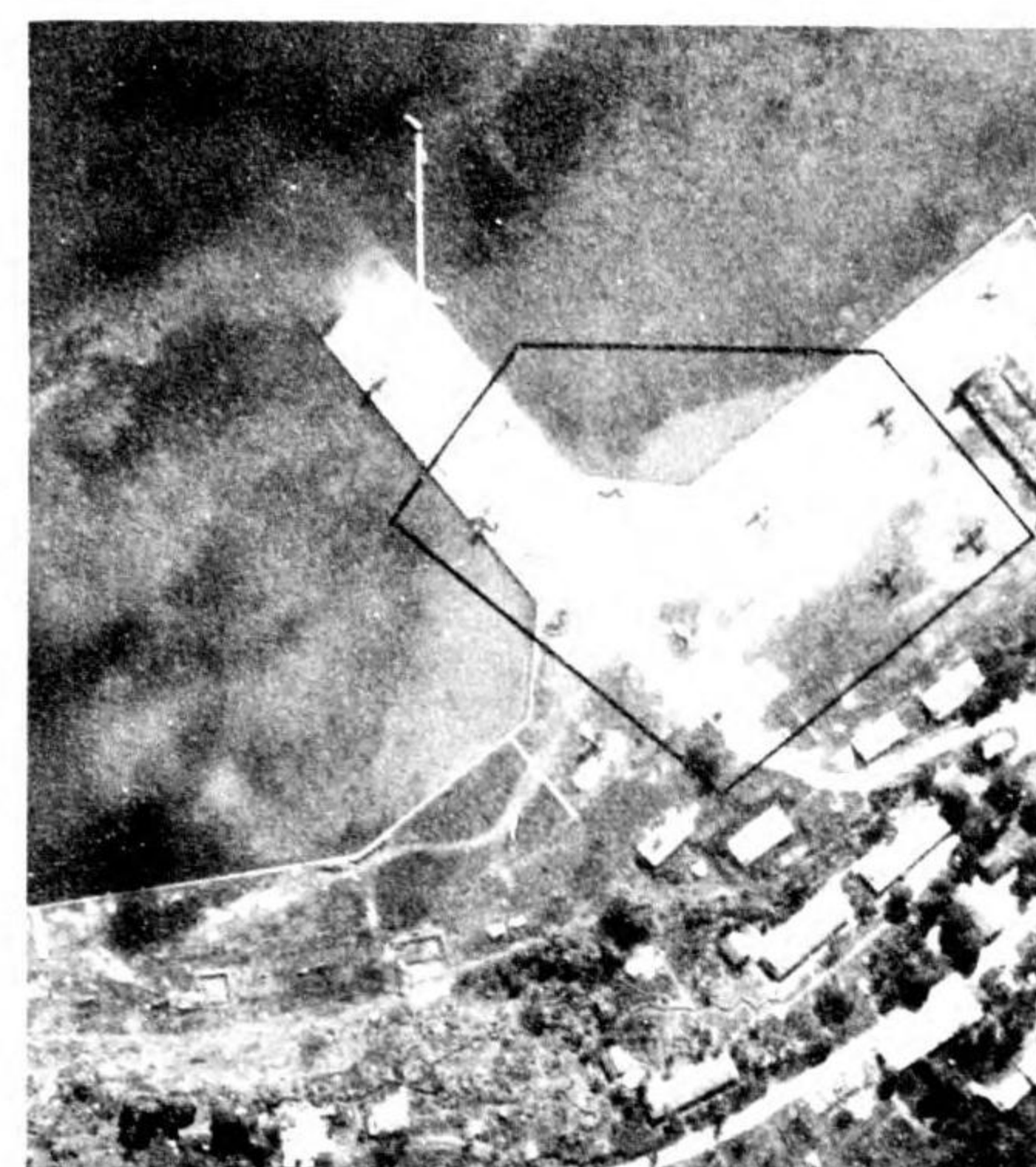
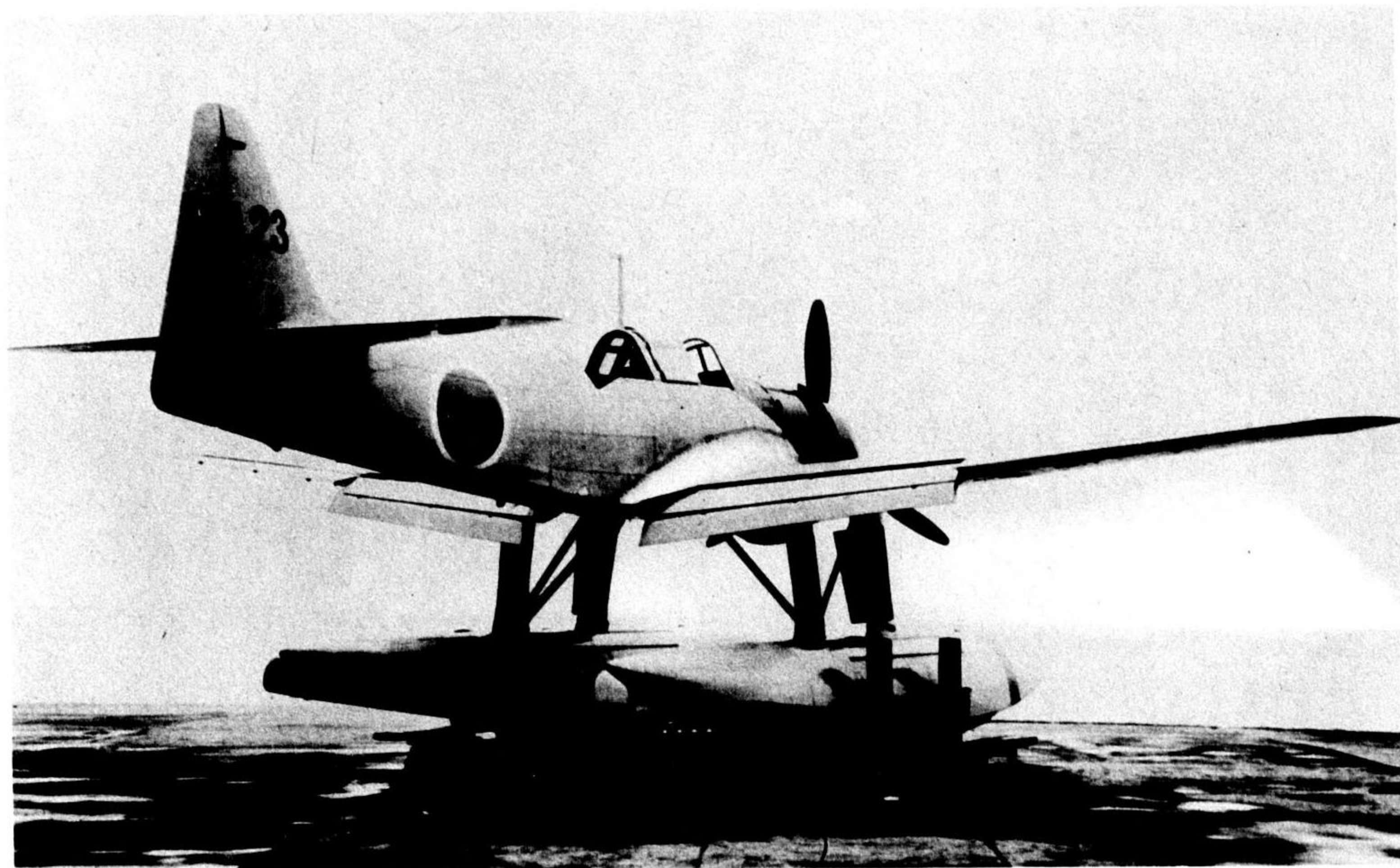


Photo Scale 1:7615

In the photo directly above are four JAKE's, five MAVIS' and three EMILY's.

When JAKE was first observed in the Andamans and the Aleutians it was thought to be a float plane version of VAL, but is actually a totally different plane of similar size and shape. JAKE may be confused with the new twin-float monoplane PAUL (see page 4.08). PAUL, however, has only a 42' wing span compared to JAKE's 47' span. The trailing edge of the wing on PAUL has a straight, sharp taper with clipped tips and the floats extend well forward of the engine. JAKE, on the other hand, has an elliptical trailing edge of the wing and the engine cowling extends forward nearly to the tips of the floats.

"PAUL"

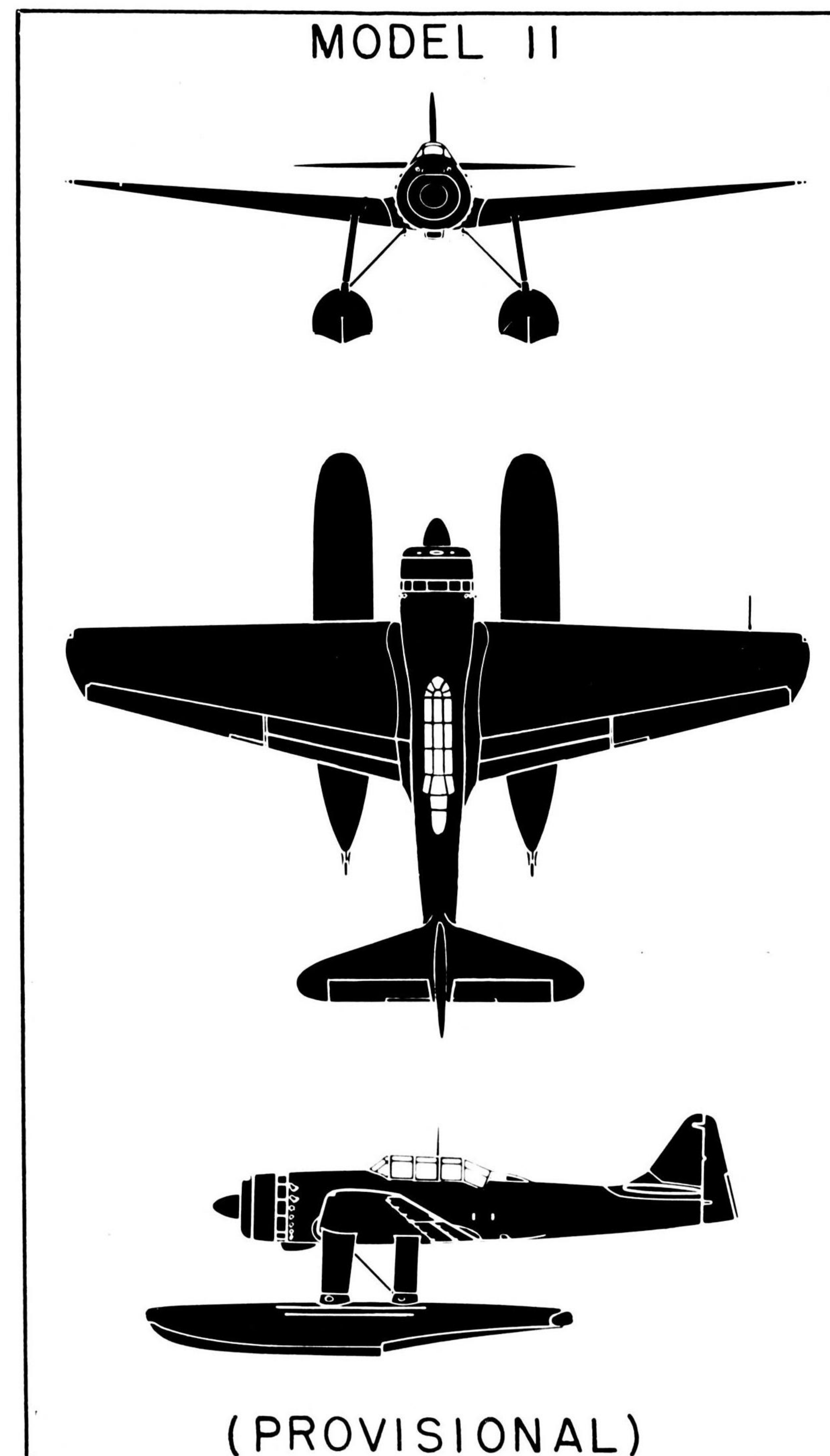


Identification Data

- Twin-float, low-wing monoplane.
- Floats extend well forward of engine.
- Wing has slight taper on leading edge, sharp taper on trailing edge and blunt wing tips.
- Two-seat greenhouse.
- Tailplane has semi-elliptical leading edge and straight trailing edge.

PAUL is also used as a dive bomber. To distinguish PAUL from JAKE see page 4.07.

- AICHI
- RECONNAISSANCE
- S - 42'
- L - 35' 7"



- NAKAJIMA 02
- FIGHTER
- S - 39' 3"
- L - 33' 10"

"RUFÉ"

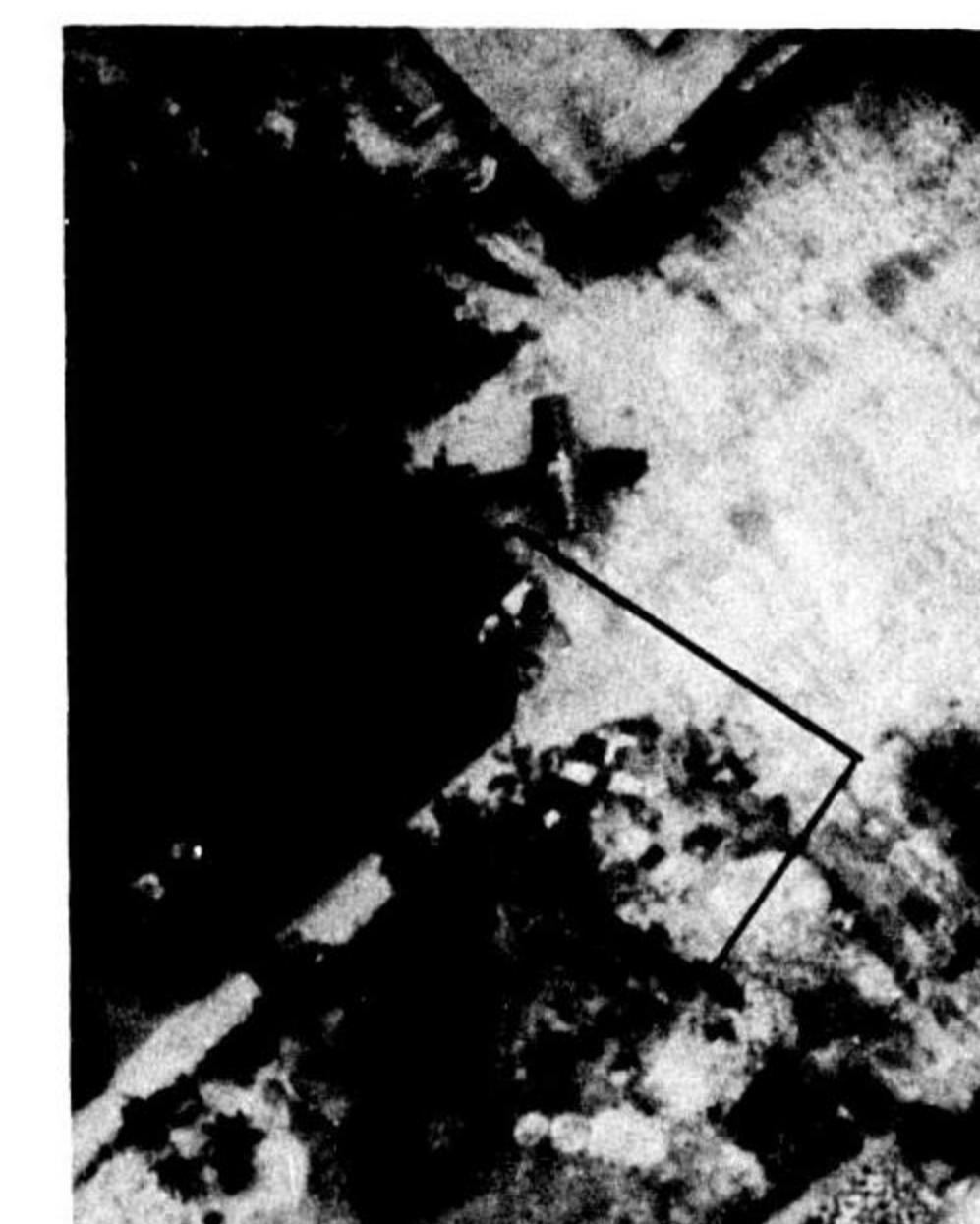
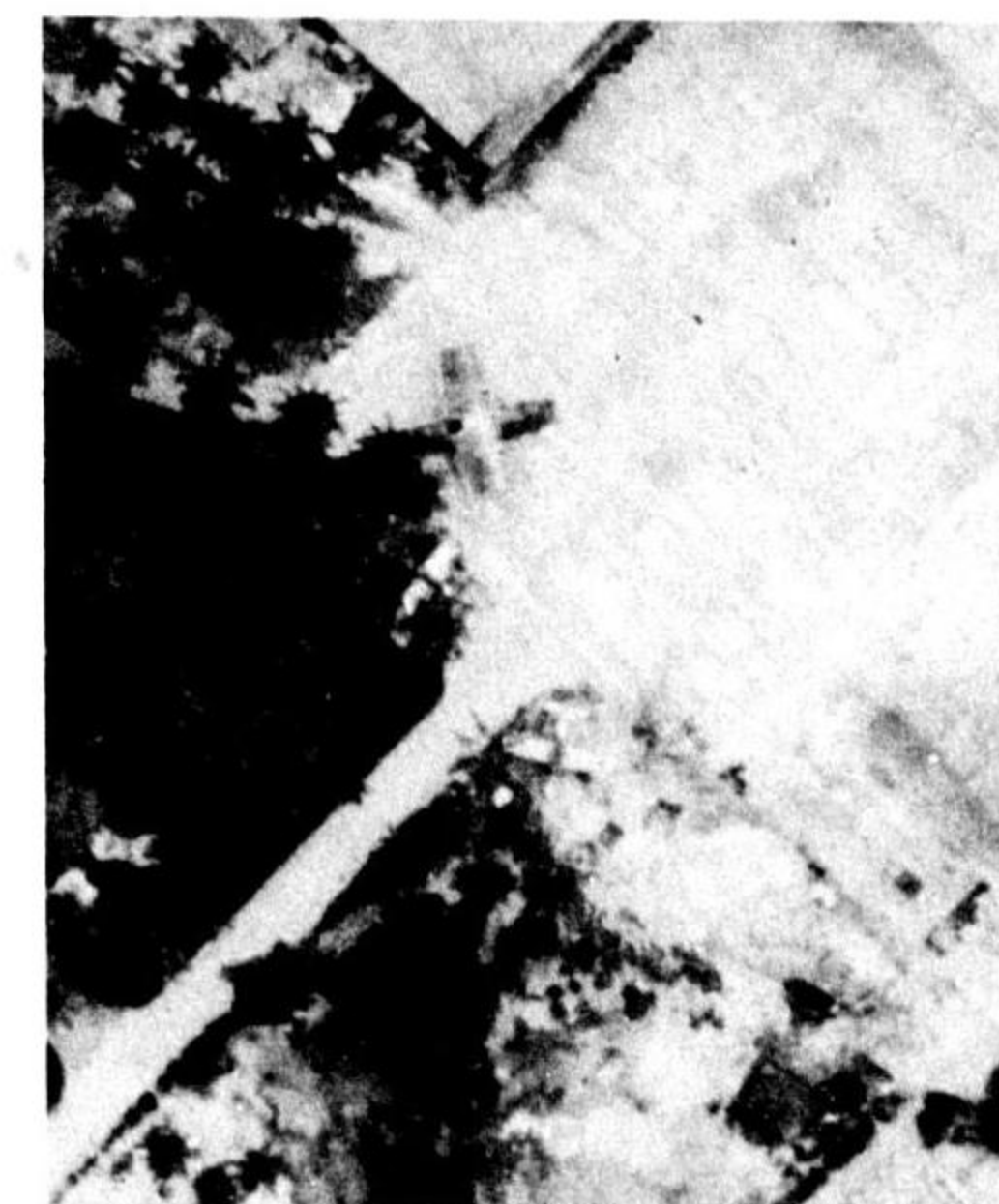
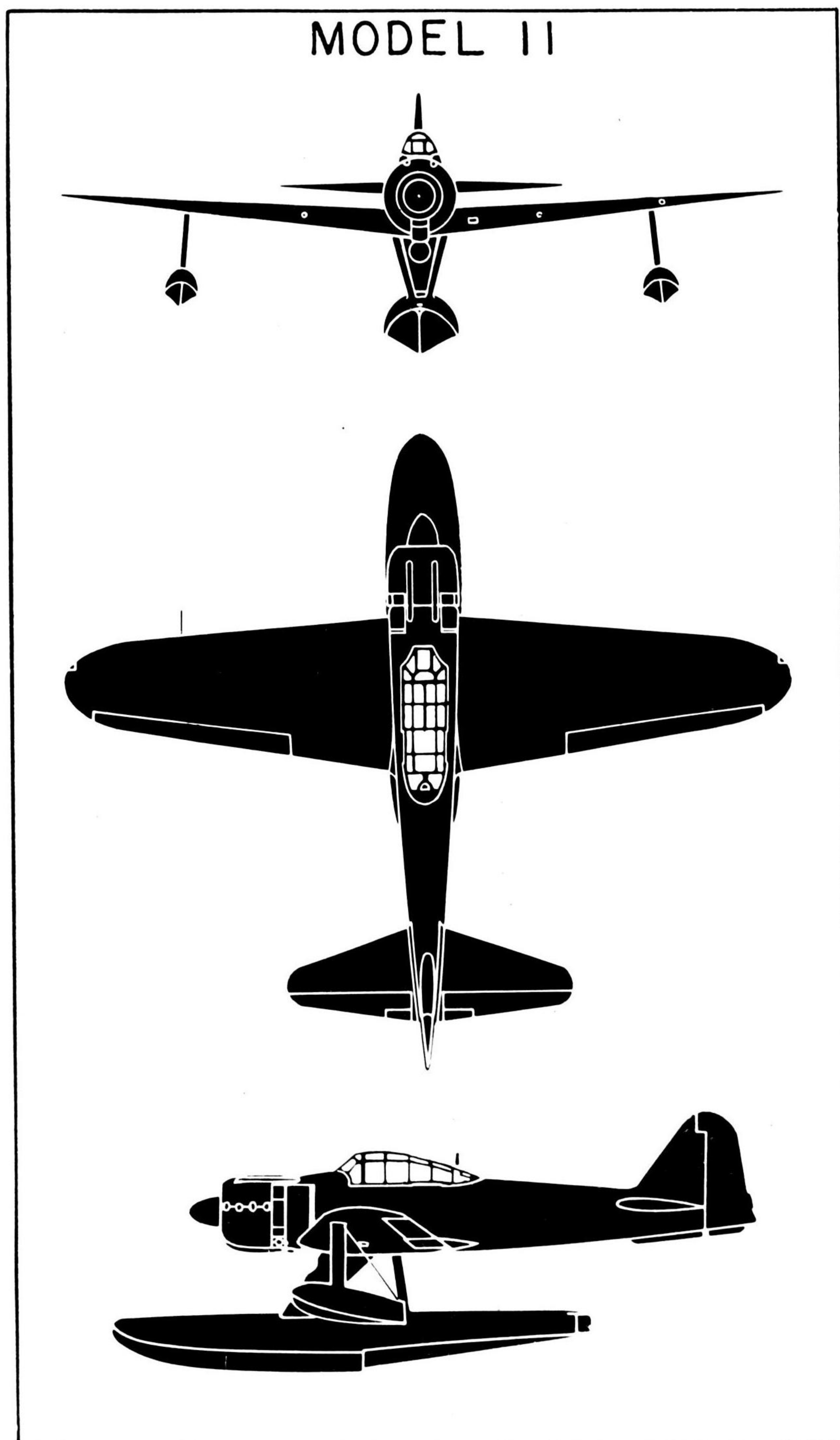


Photo Scale 1:2630

Identification Data

- Single-float, low-wing monoplane.
- Wing has even, moderate taper, rounded tips.
- Radial engine projects well forward of leading edge of wing.
- Rudder projects noticeably aft of tailplane.
- Leading edge of tailplane has sharp taper, trailing edge a slight taper.
- Small, high-set greenhouse.
- Two small wing floats.

RUFÉ is also used as a reconnaissance plane.

RUFE

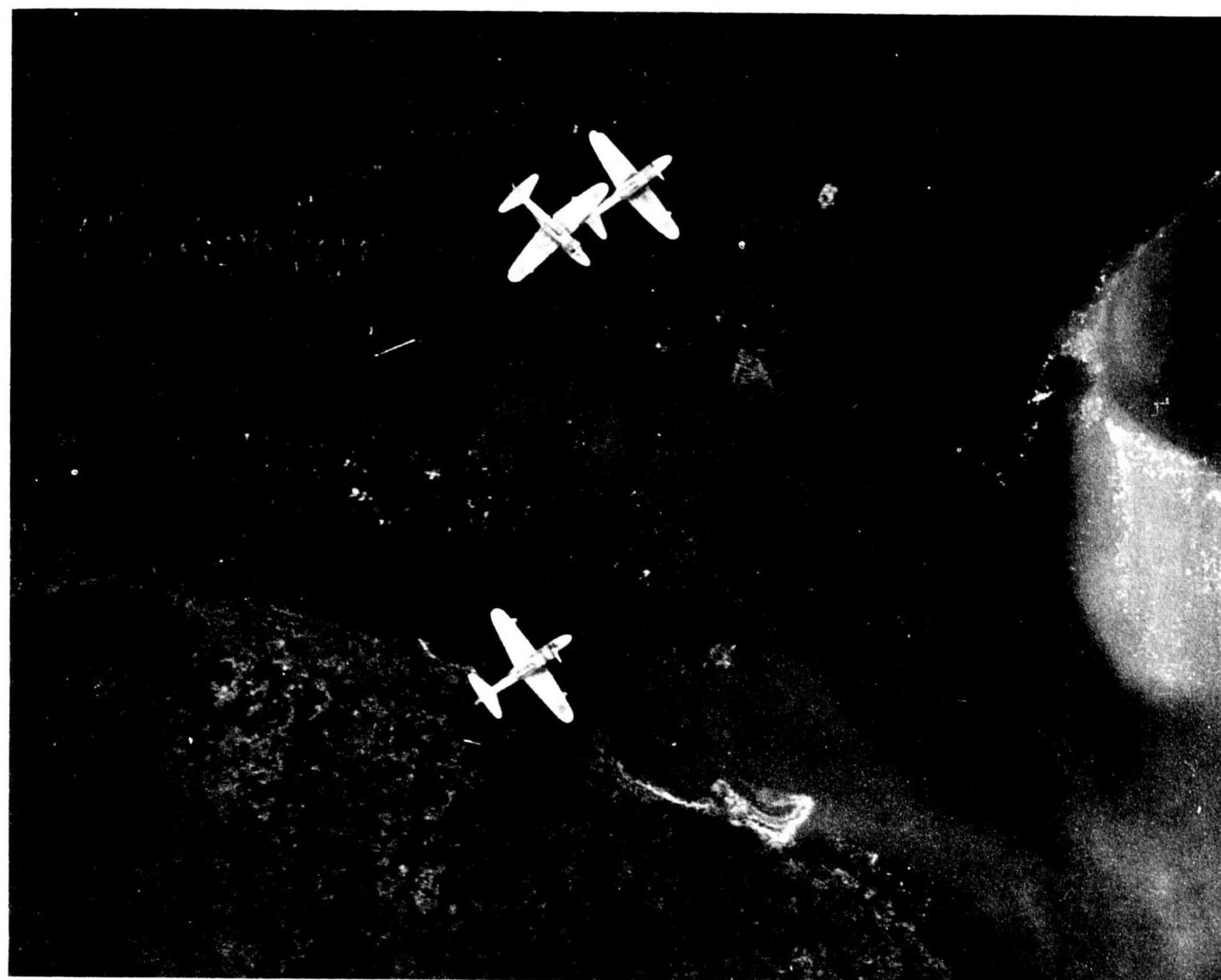


Photo Scale 1:835

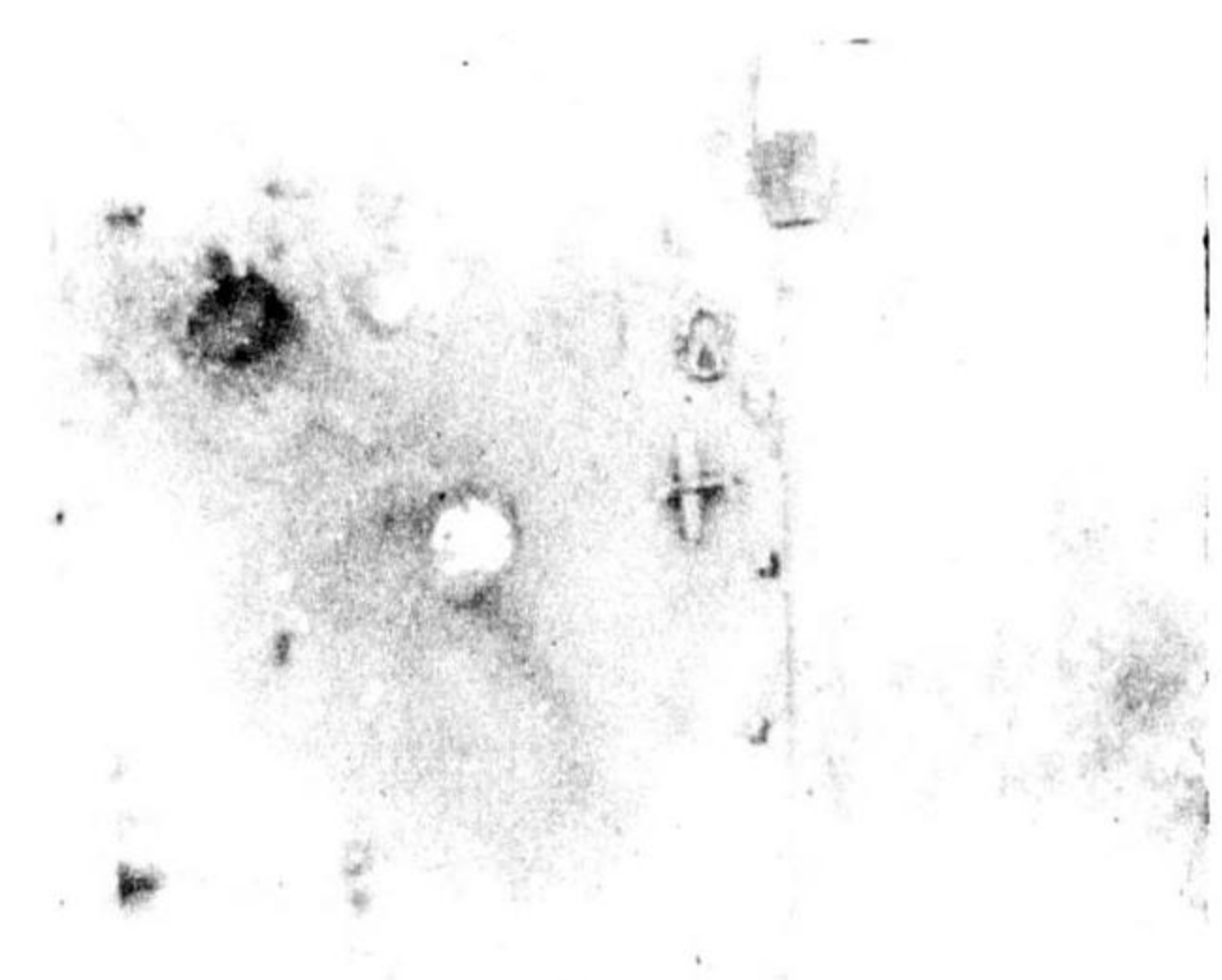
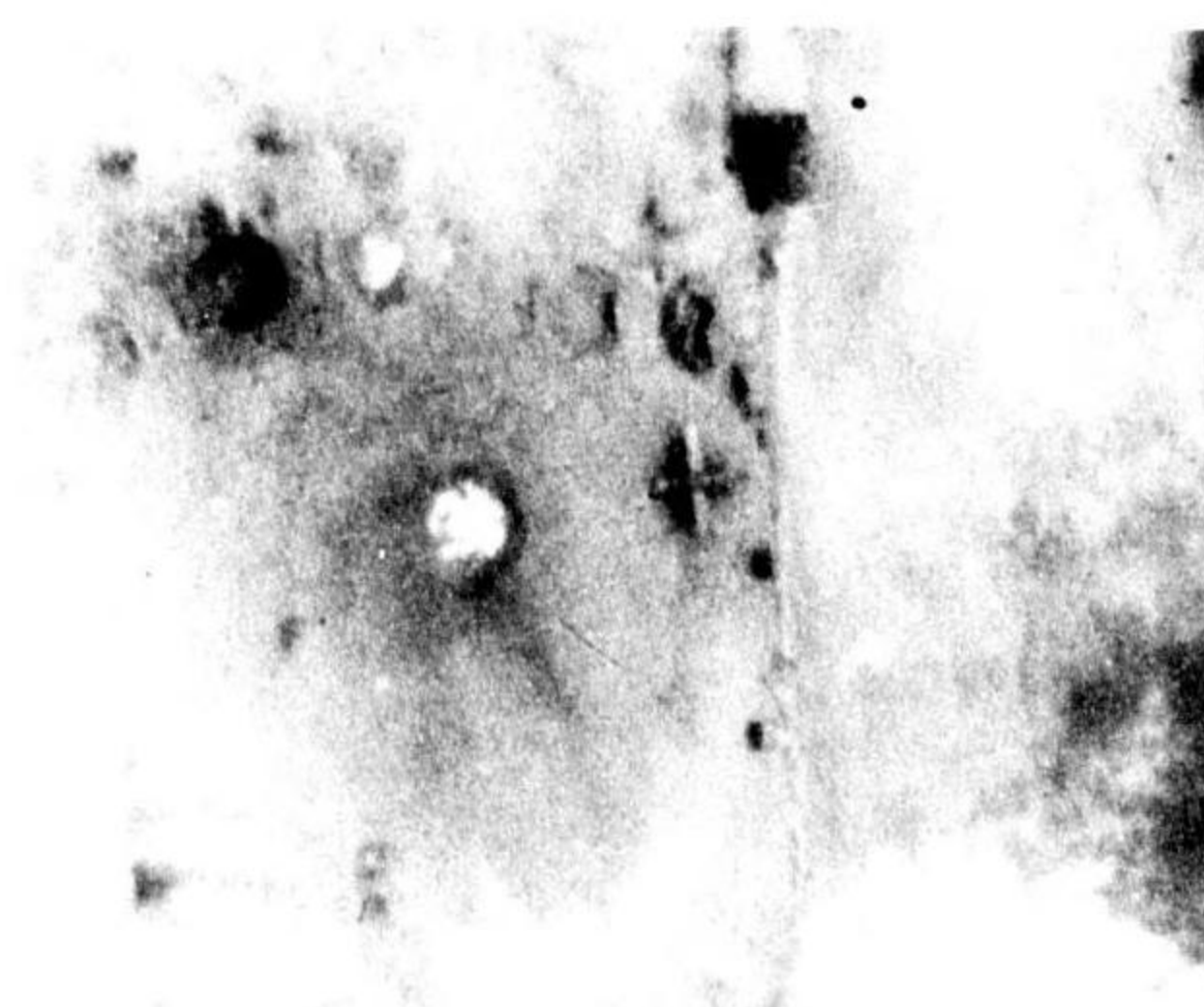


Photo Scale 1:2600

Float planes with a central pontoon often give the impression of having an unusually long engine nacelle forward of the wing. Length of a float plane is measured from the forward tip of the float.

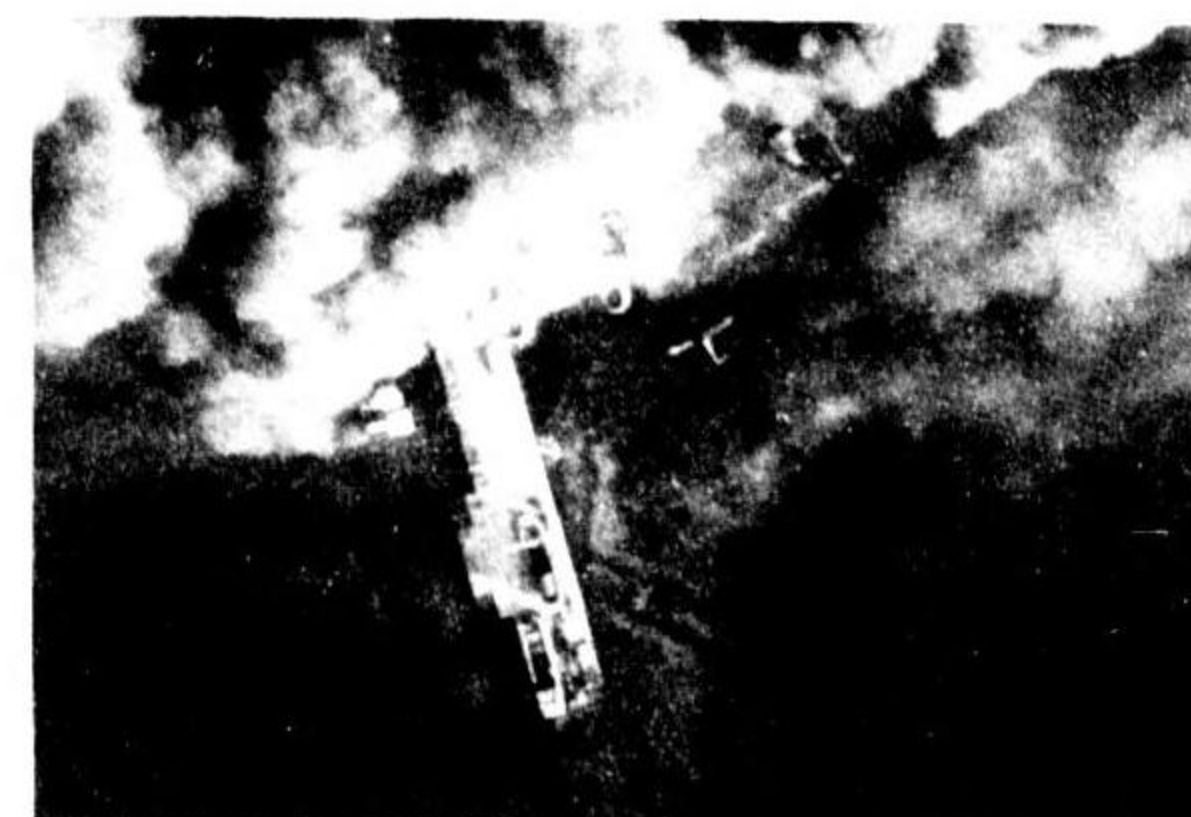


Photo Scale 1:3635

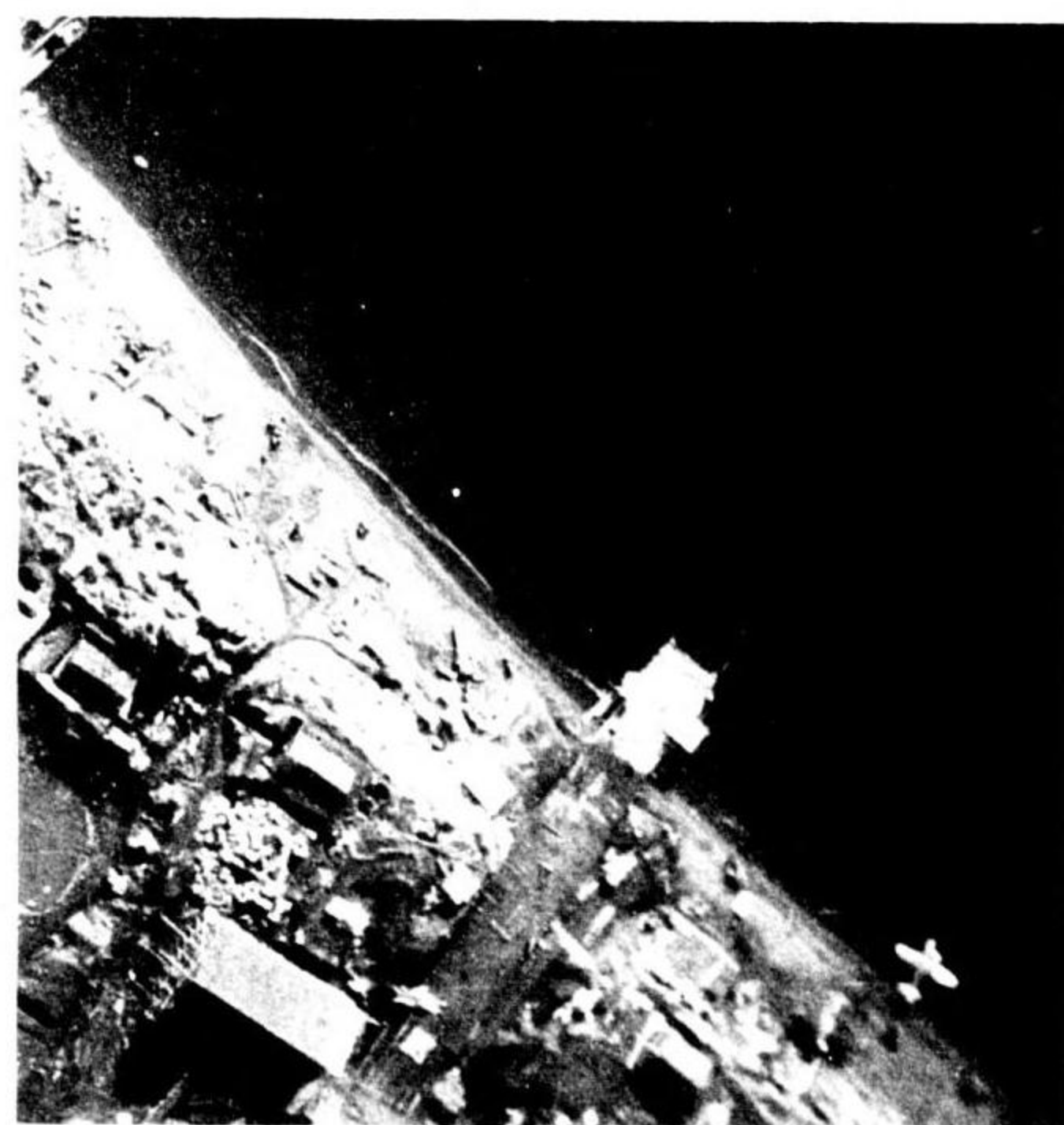
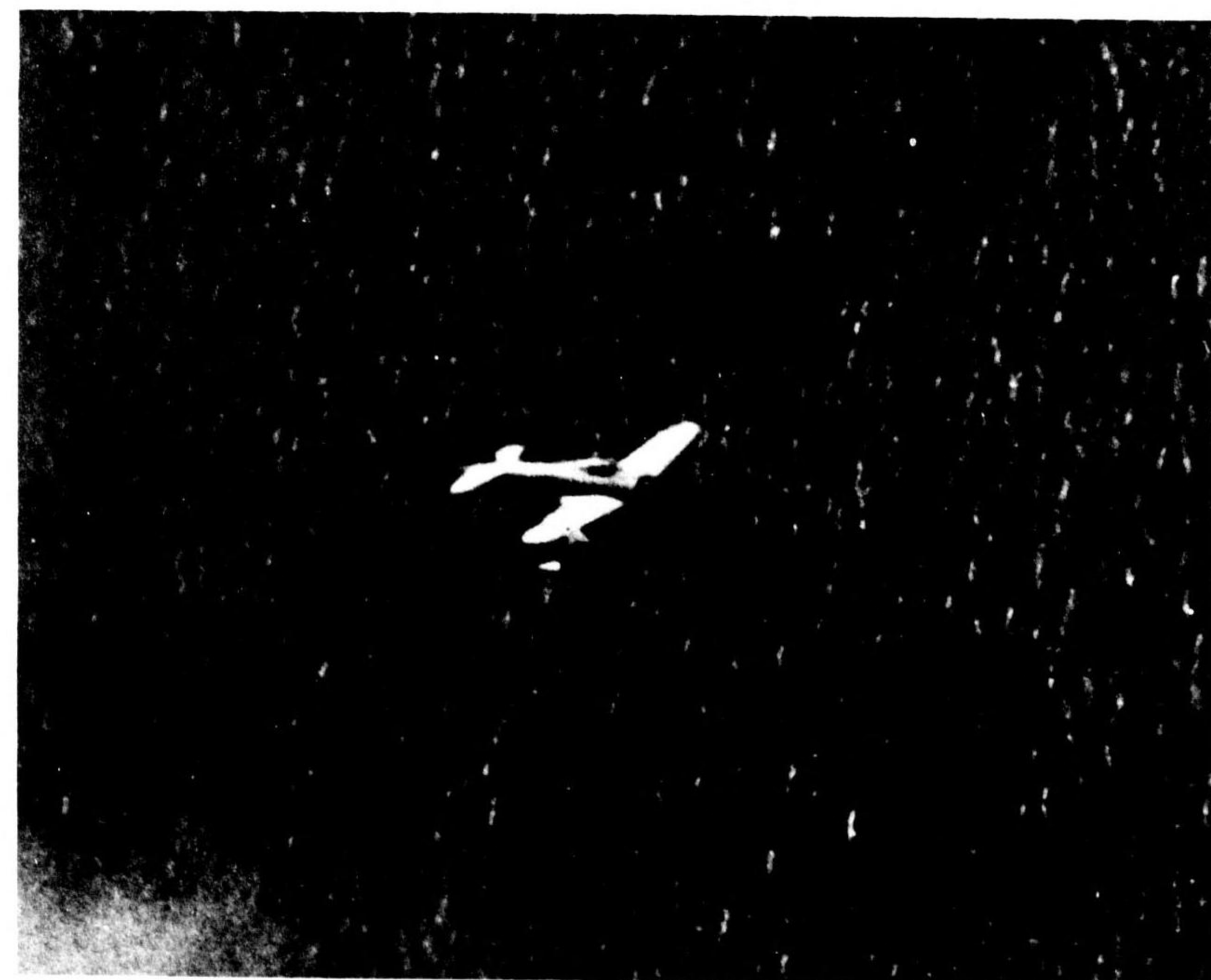
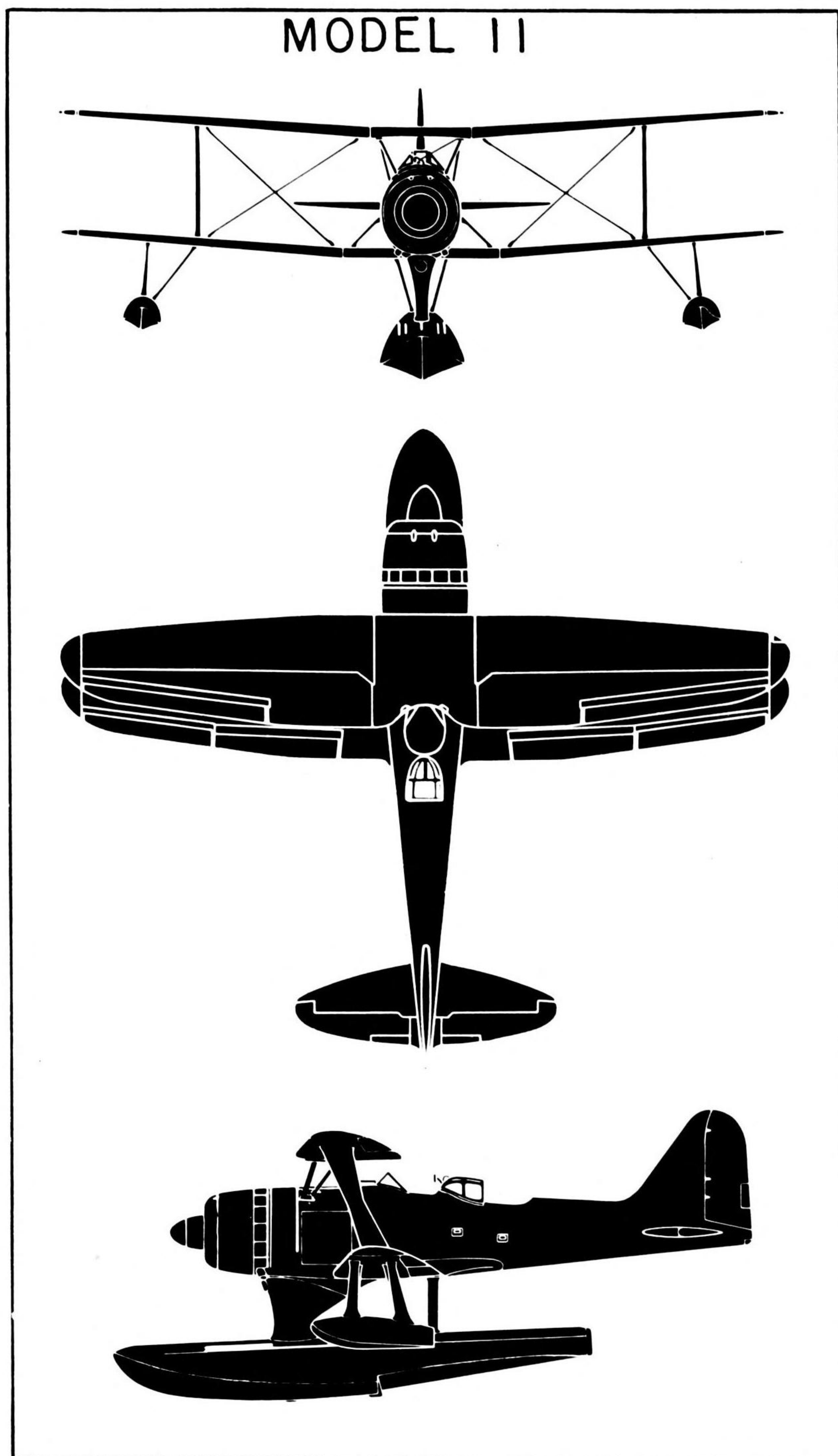


Photo Scale 1:2960

RUFE is a development of ZEKE 21. It is the same plane as ZEKE save for the addition of a central float and a general strengthening of the structure. Look for the single float, the evenly tapered wing and the rudder projecting aft of the tailplane.



- SASEBO 00
- RECONNAISSANCE
- S - 36' 1"
- L - 31' 1"



R E S T R I C T E D

"PETE"

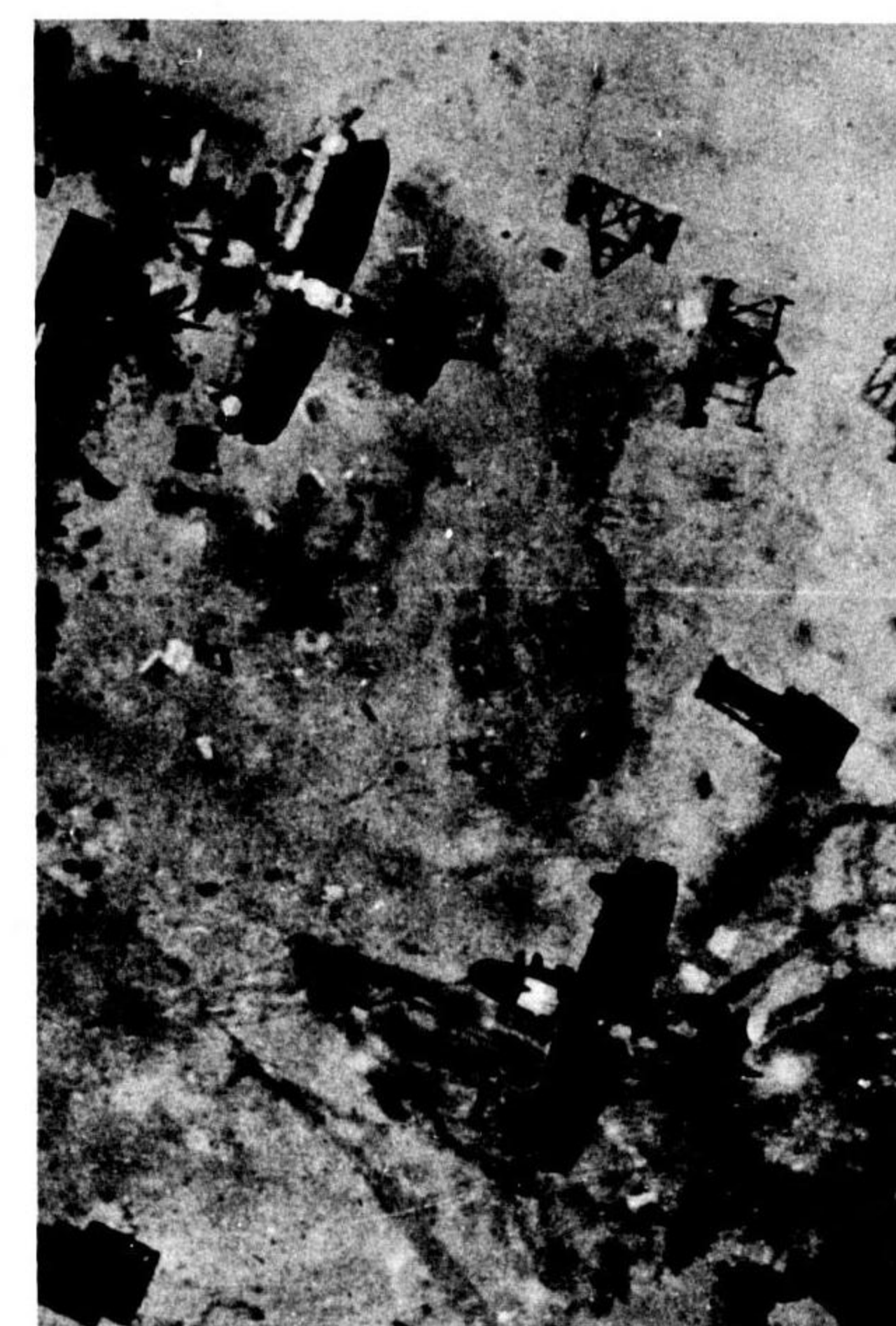


Photo Scale 1:580

Identification Data

- Single-float biplane.
- Upper wing is staggered forward of lower wing and has slight taper to leading edge, elliptical trailing edge with a notch over the fuselage.
- Tapered tailplane with rounded tips.
- Round fuselage tapers aft noticeably.
- Two open cockpits.
- Twin stabilizing wing floats.

PETE is also used as a light bomber.

PETE



Photo Scale



1:600

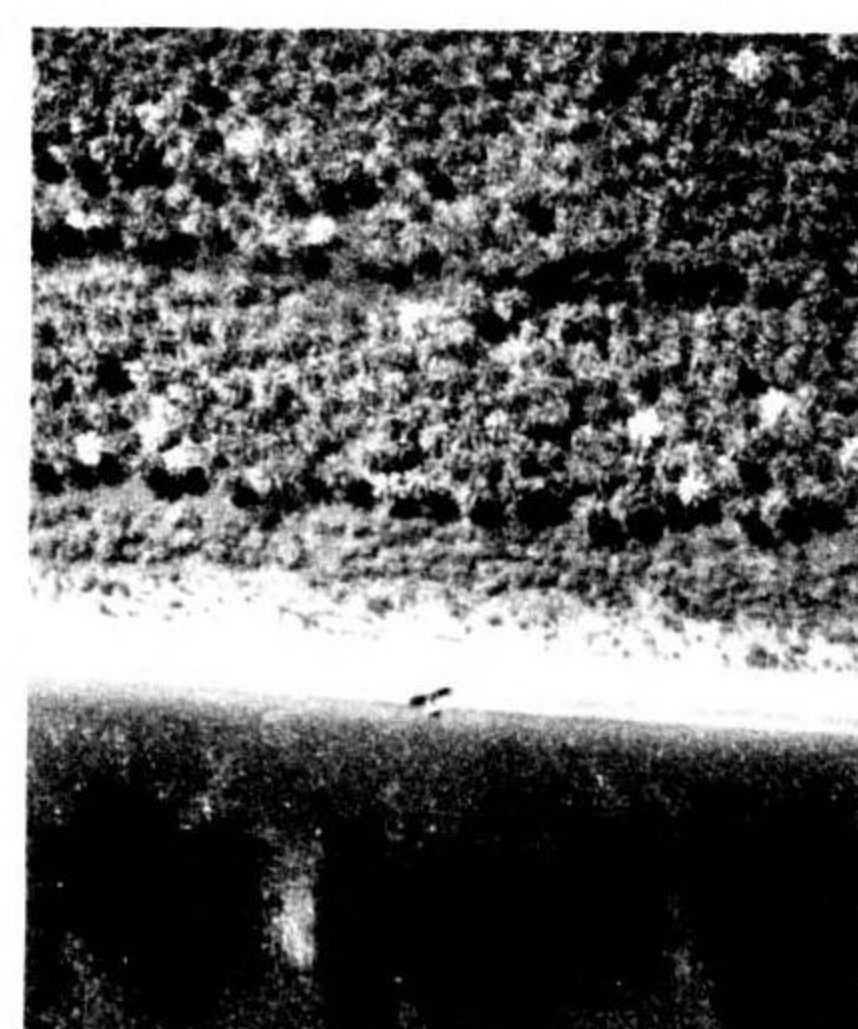


Photo Scale



1:6355

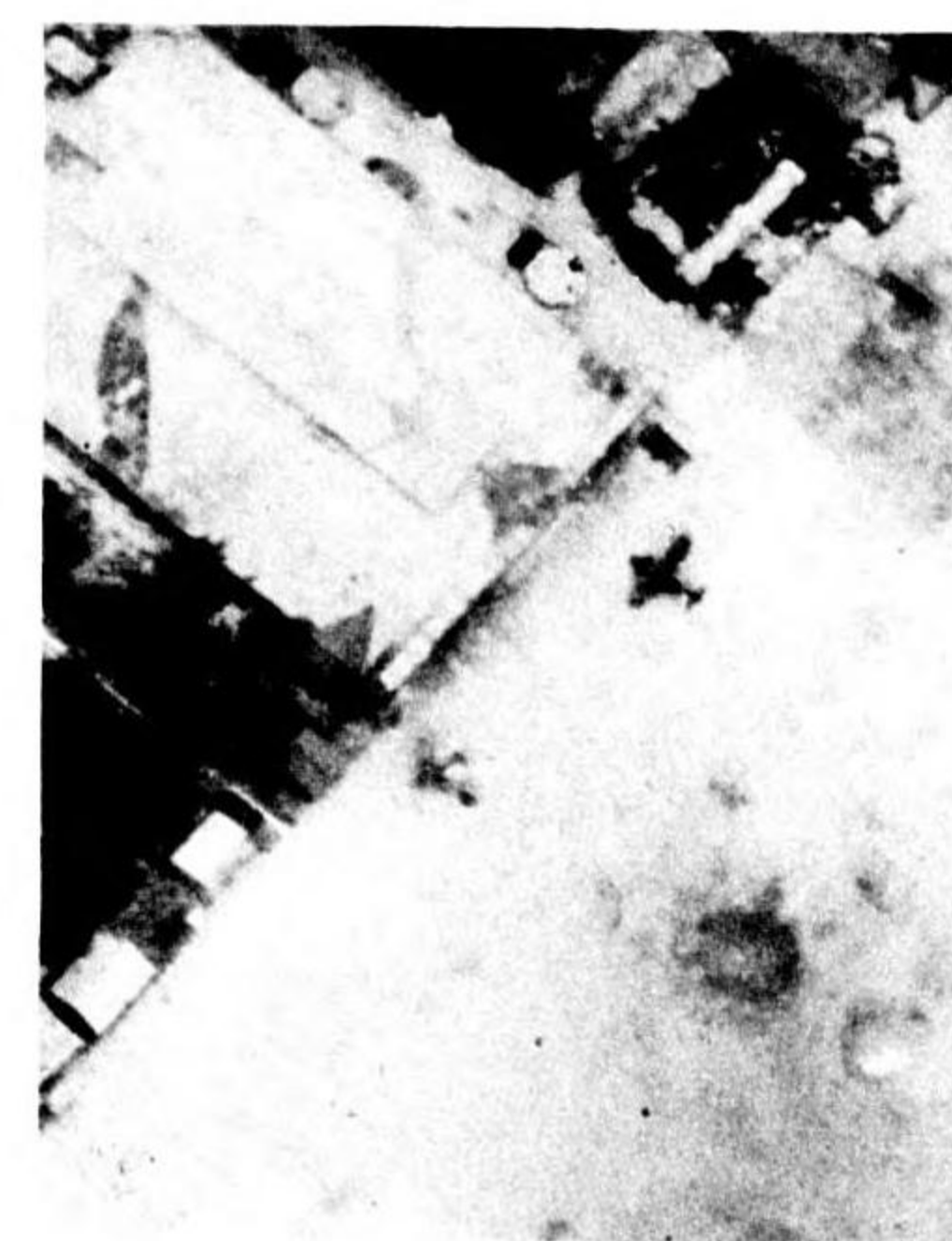


Photo Scale



1:2600



Photo Scale



1:2600

JAKE at left, PETE at right. Note how PETE's fuselage tapers aft to a thin cone.



Five PETE's in the foreground, JAKE at the rear.

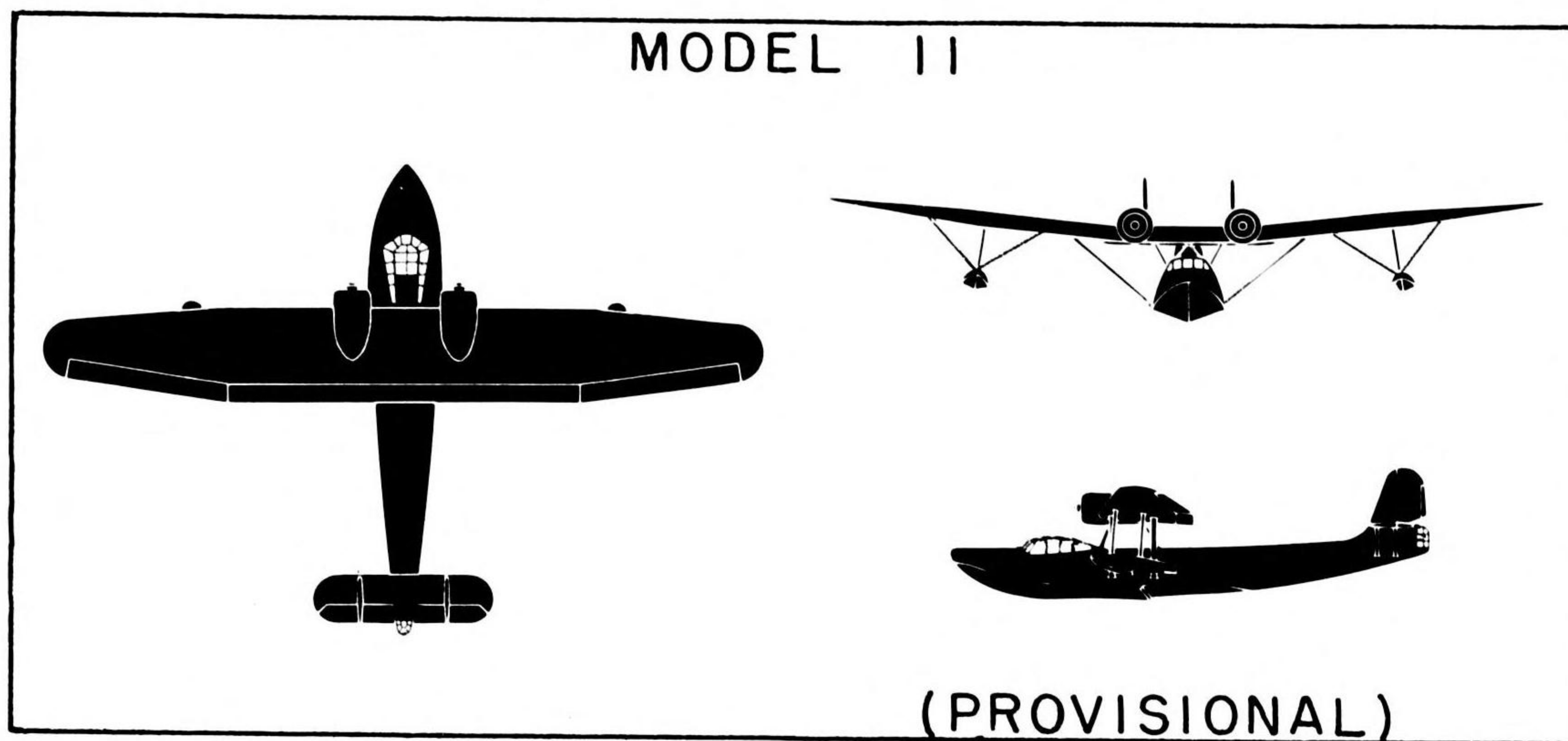
SECTION-5

5.01 5.99

OBSOLETE AIRCRAFT

RESTRICTED

"CHERRY"



- KAWANISHI 99
- PATROL BOMBER
- S - (108')
- L - (70')



Photo Scale



1:6385

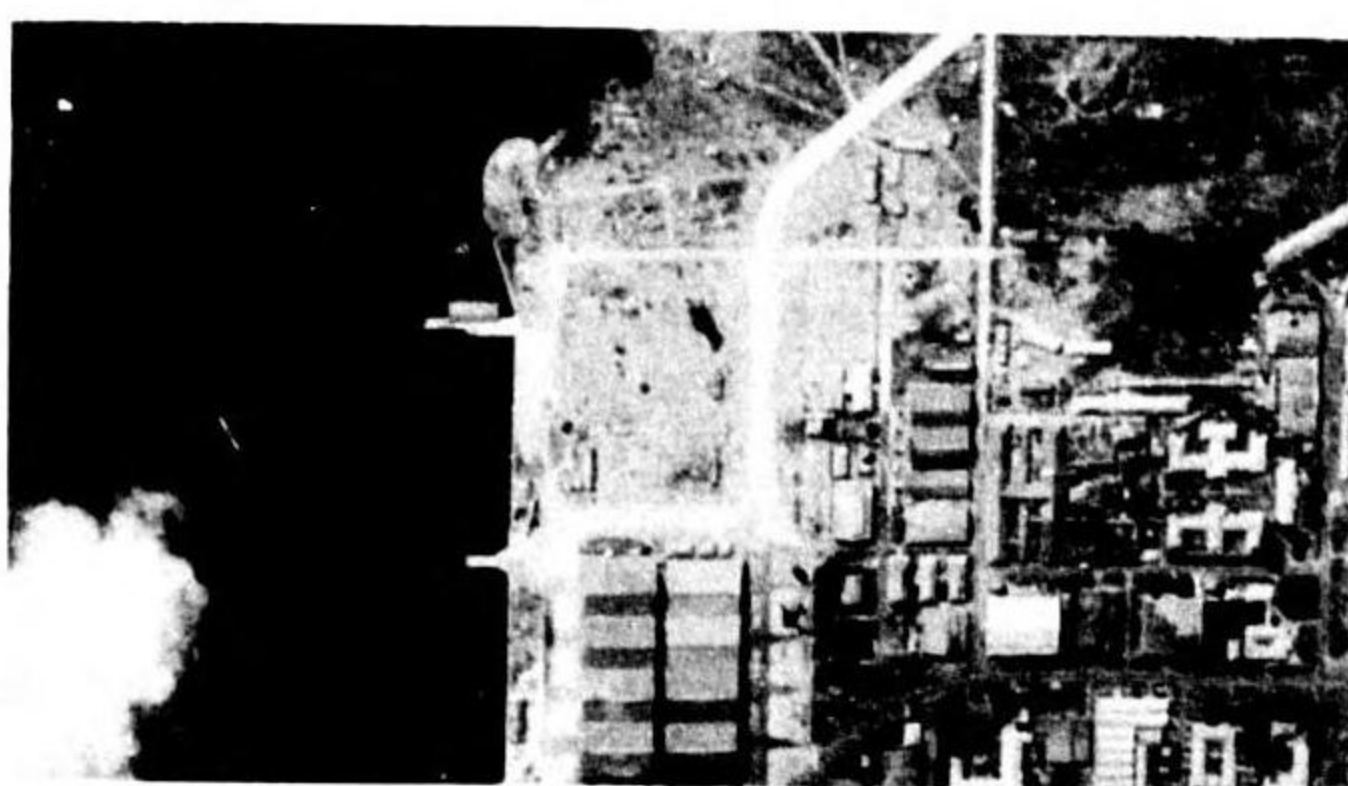
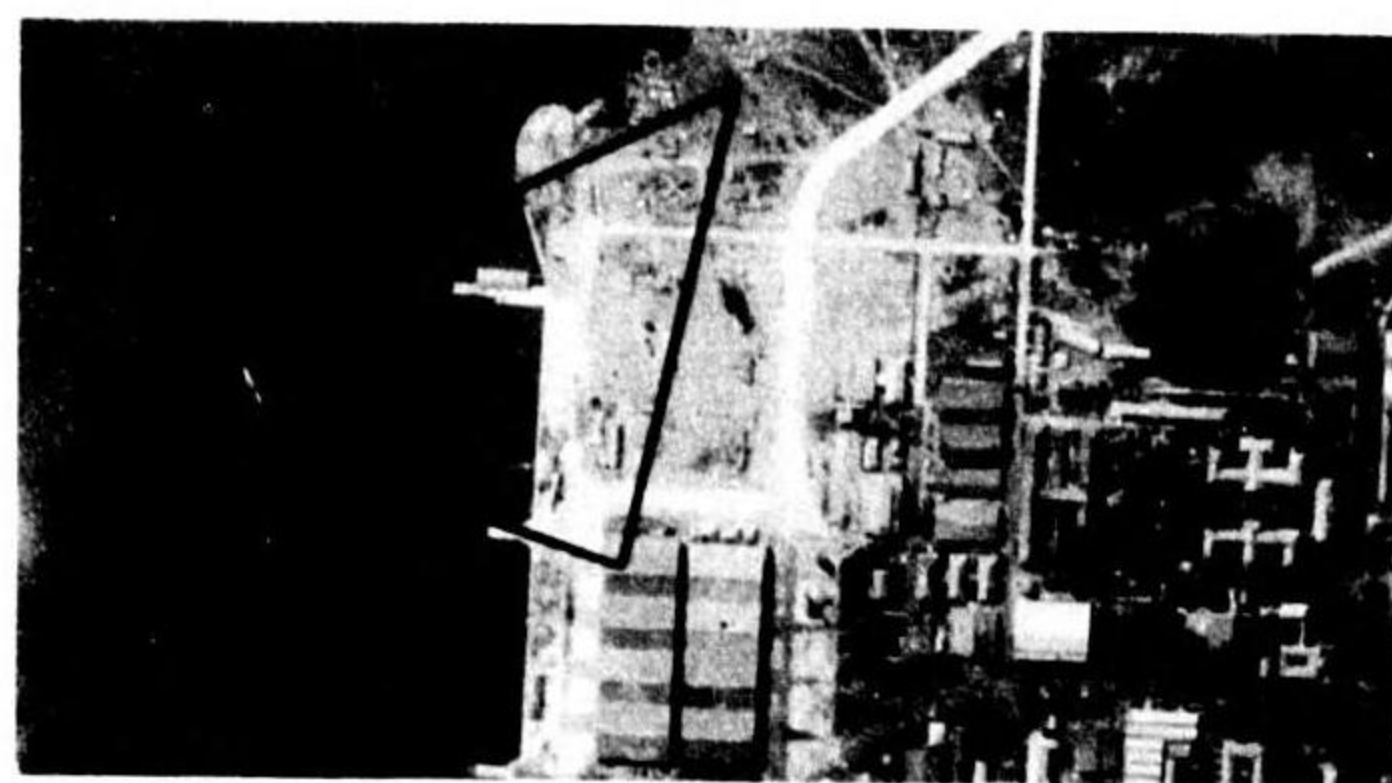


Photo Scale

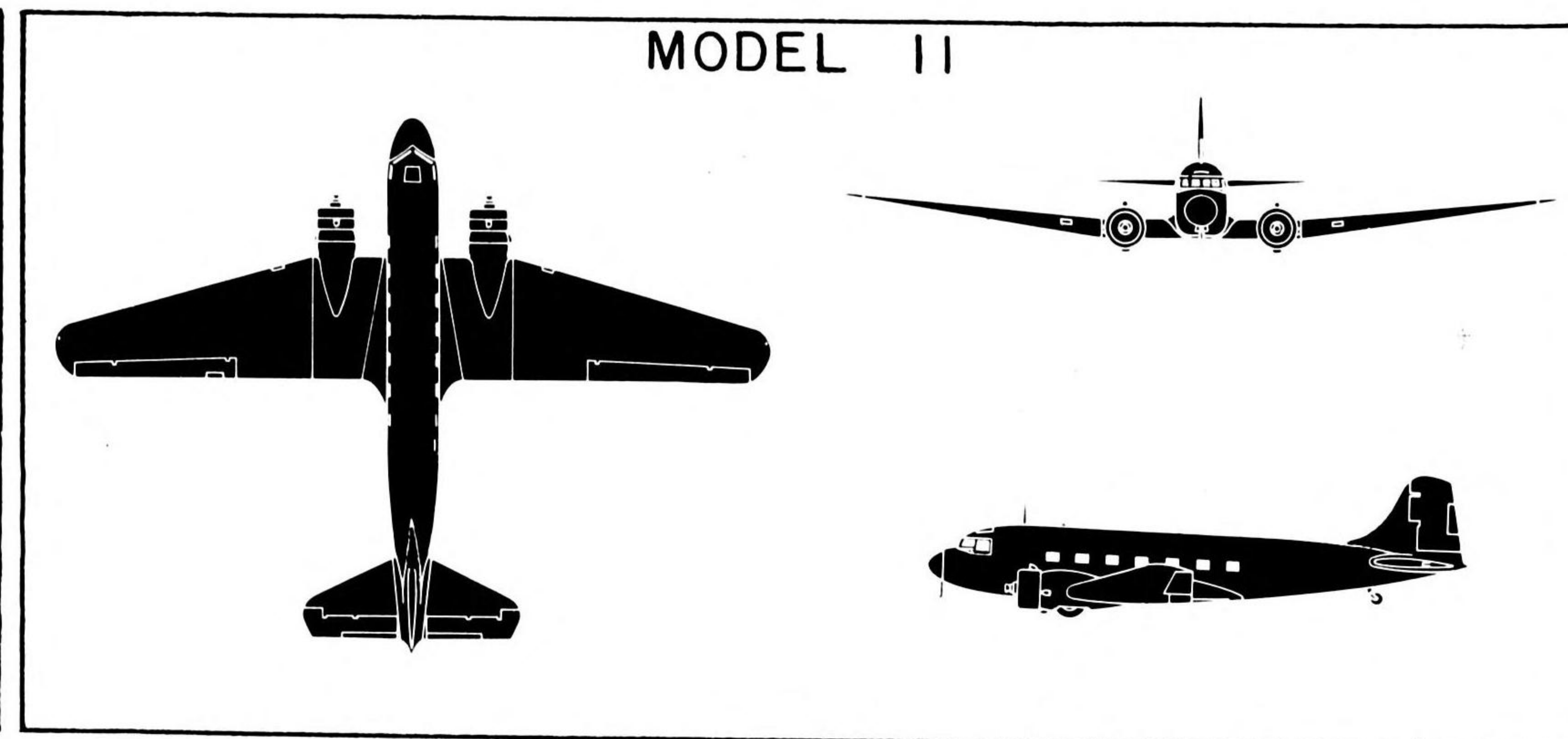


1:17,515

CHERRY is rarely reported but may be seen in waters close to the Empire. Similar to MAVIS in design it is distinguished by its two engines and smaller size. Both planes have a parasol wing of similar shape and twin fins and rudders.

R E S T R I C T E D

"TESS"



- NAKAJIMA 00
- TRANSPORT
- S - 85'
- L - 62'

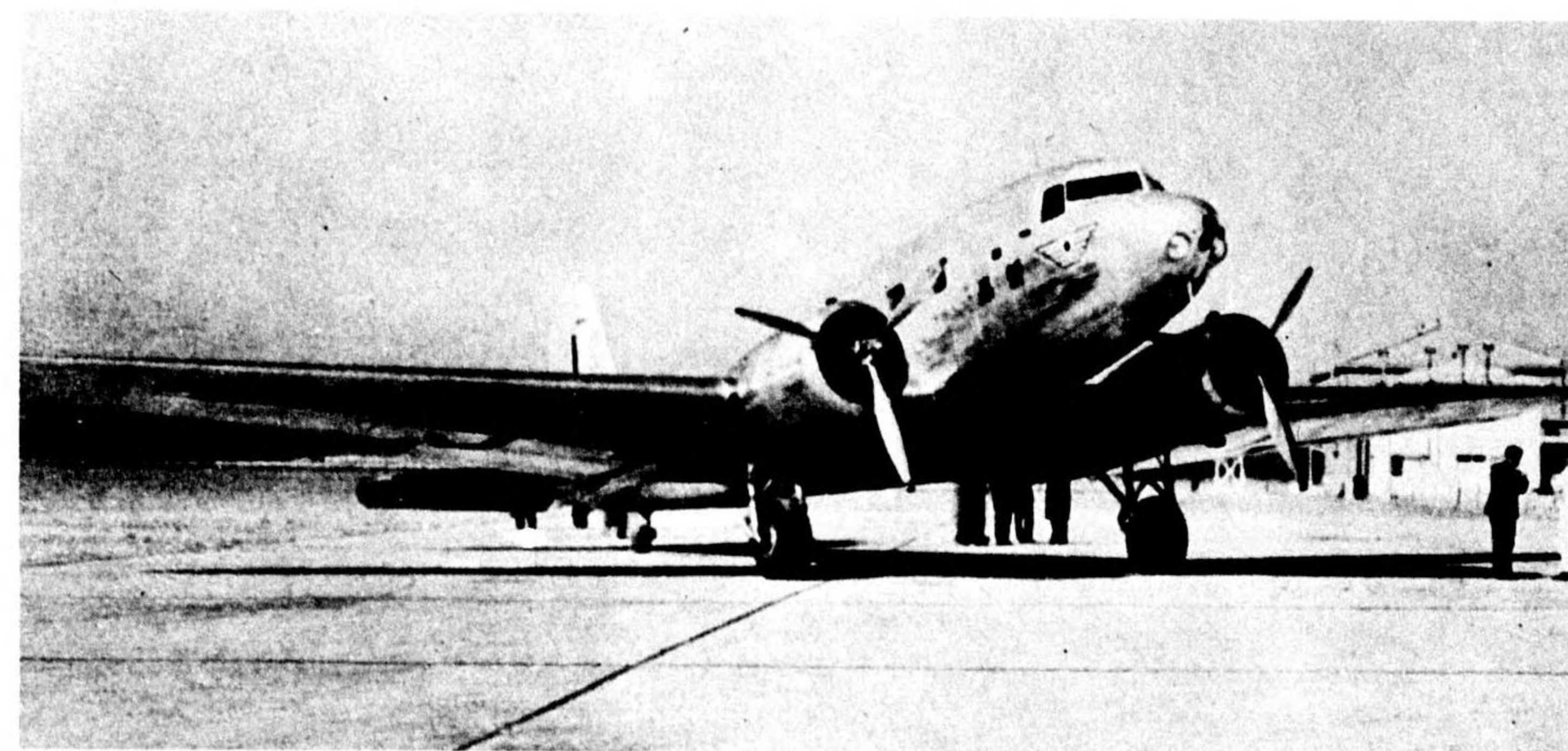


Photo Scale

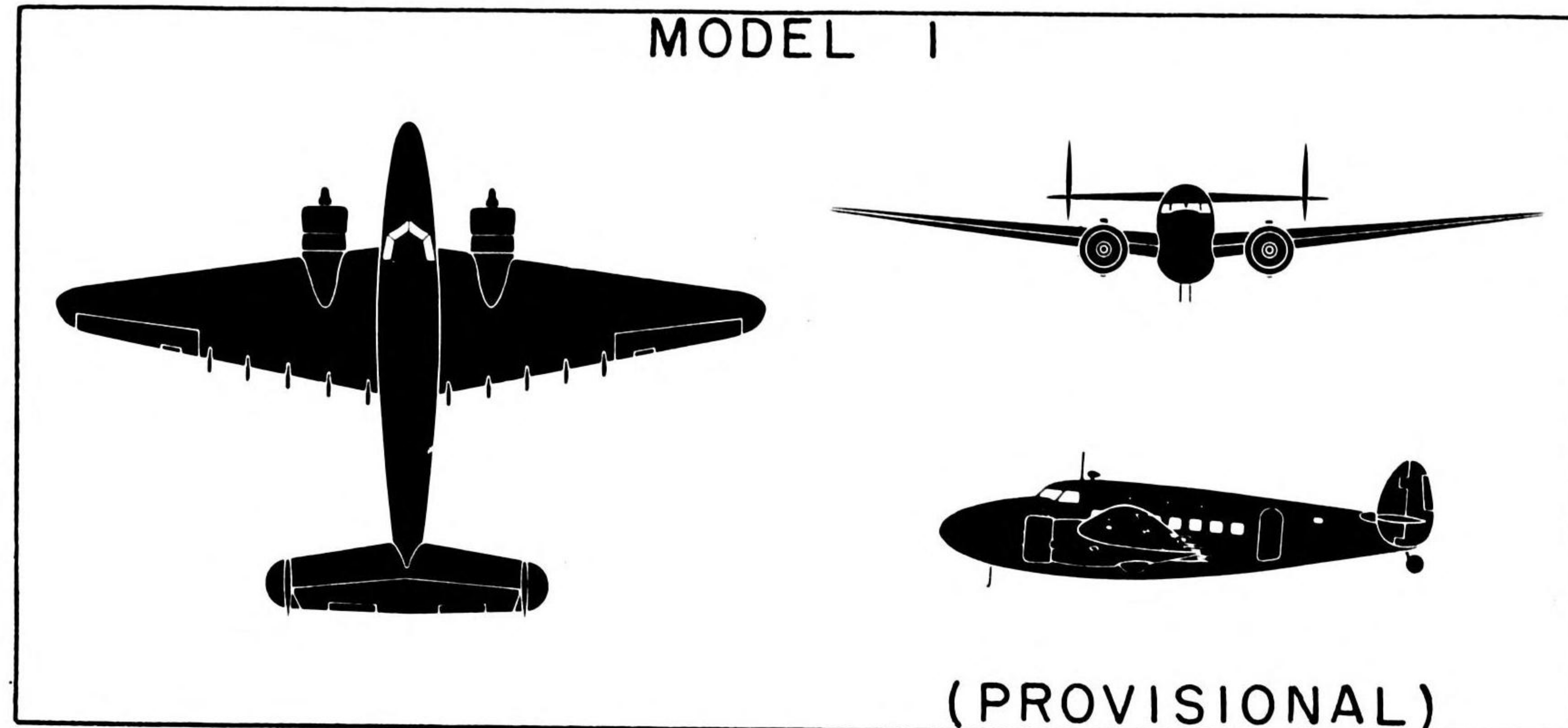


1:5860

TESS is the Japanese version of the U.S. DC-2 transport. Very similar to TABBY in plan view it has the same length as TABBY but a considerably shorter wing span. The wing tips on TESS are much blunter than on TABBY and the tail section also differs. Showa also manufactures TESS.

"THELMA"

MODEL I



(PROVISIONAL)

- KAWASAKI 00
- TRANSPORT

- S - 65' 6"
- L - 44' 4"

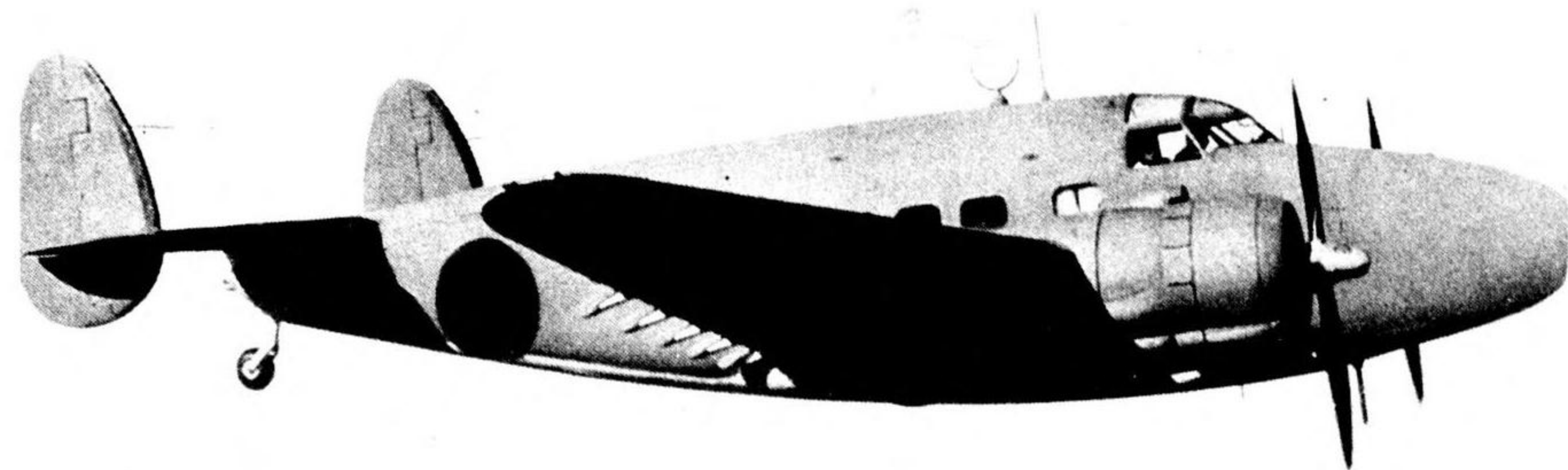


Photo Scale

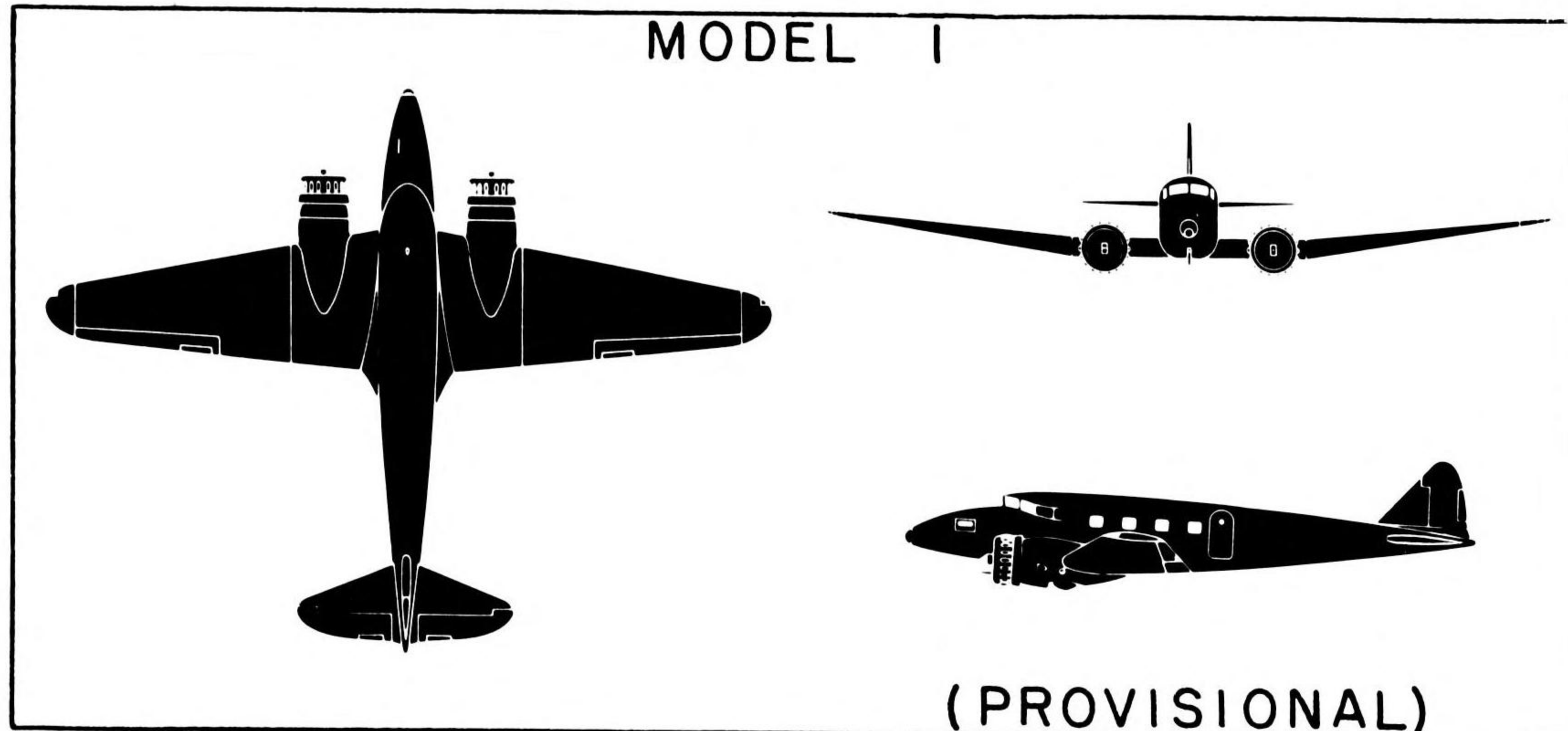


1:9360

THELMA is the Japanese version of the U. S. Lockheed 14 transport. It is distinguished by its equally tapered fat wing and by twin fins and rudders set on a tailplane of exceedingly wide span.

"THORA"

MODEL I



(PROVISIONAL)

- NAKAJIMA 97
- TRANSPORT

- S - 65' 3"
- L - 50'



Photo Scale



1:5600



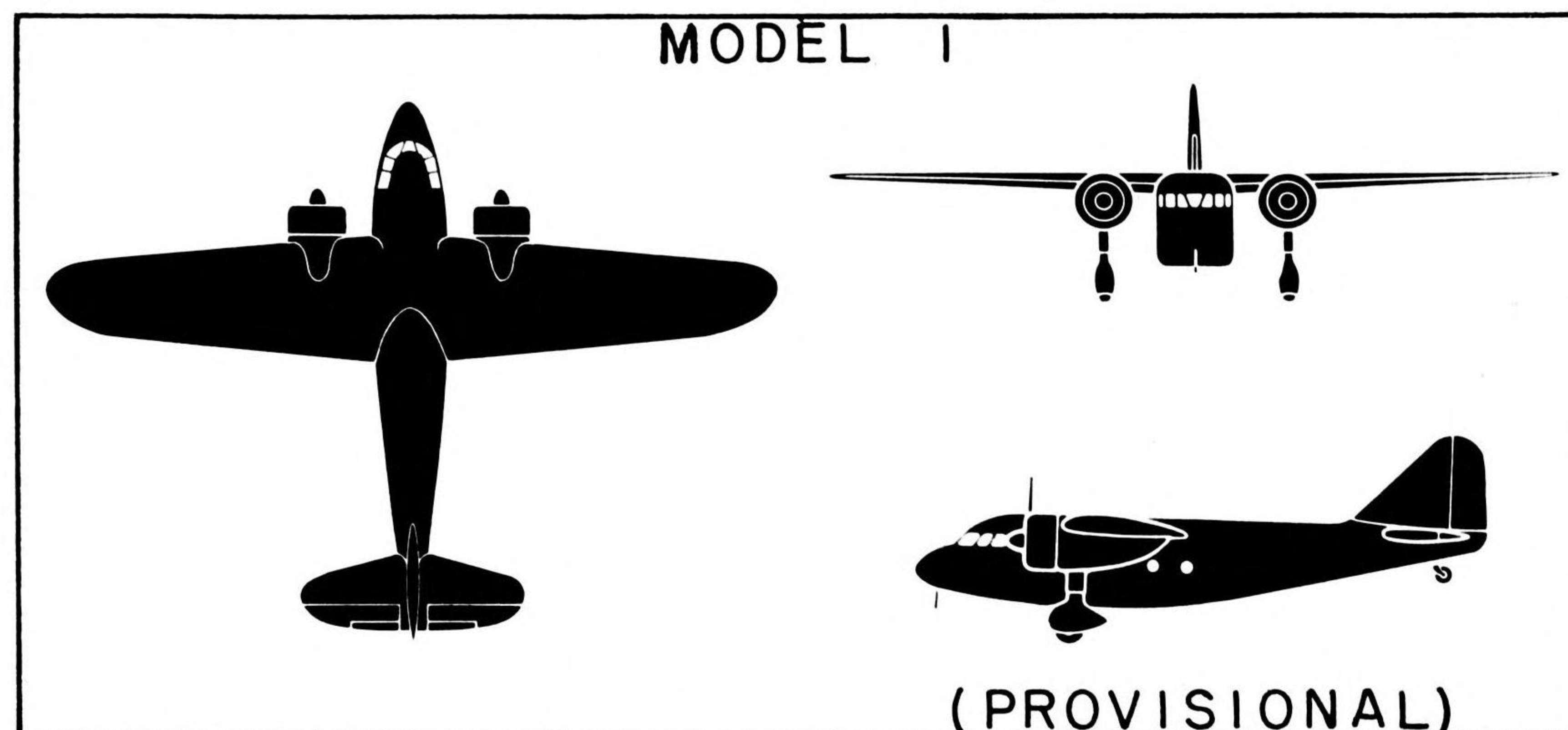
Photo Scale



1:8910

THORA is the military version of a Japanese civilian air transport and is being utilized in China, Burma and the Philippines. In plan view it is very similar to TOPSY save for the trailing edge of the wing being nearly straight.

"THERESA"



- N.K.K. 01
- TRANSPORT

- S - 55' 9"
- L - 41'

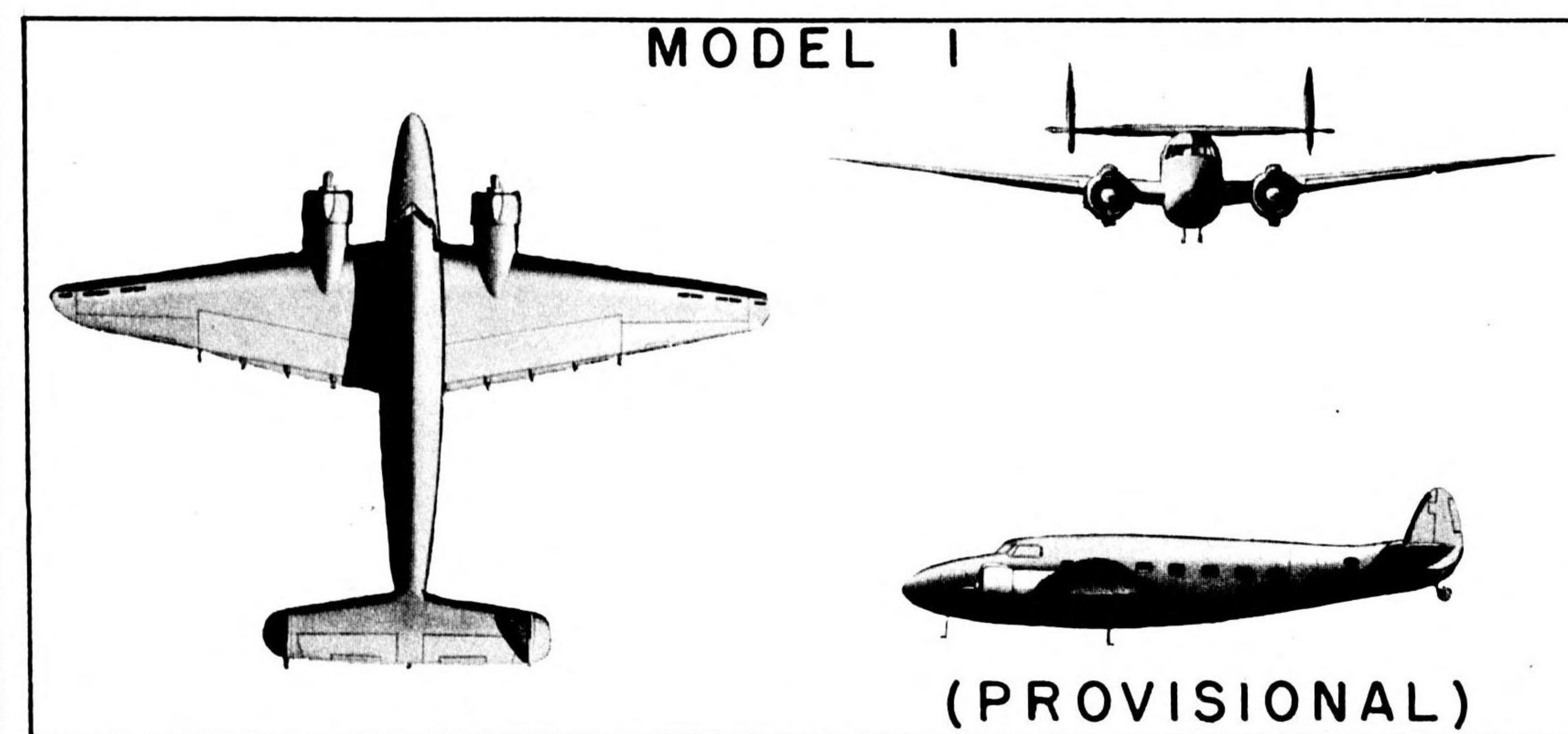
THERESA is the military development of a civilian transport known as the N.K.K. T.K.3. No photographs are available at this time and its military usage as believed to be very limited.

THERESA is a high-wing, twin-engine monoplane of ancient design. The fuselage is box-like and low-slung. The engines are underslung and very stubby. In plan view note also the fat, bulky fuselage nose. The wing has a fairly equal taper to the leading and trailing edges and has rounded wing tips. The rudder projects slightly aft of the tailplane.

For identification purposes the distinguishing features of THERESA are the high-wing construction, the plan shape of the wing and the relation of the bulky fuselage nose to the stubby engines. THERESA may be confused with the Type 1 Advanced Trainer which is quite similar in plan and in dimensions but which has a low-wing construction.

RESTRICTED

"THALIA"



- KAWASAKI
- TRANSPORT

- S - 65' 6"
- L - 48' 10"

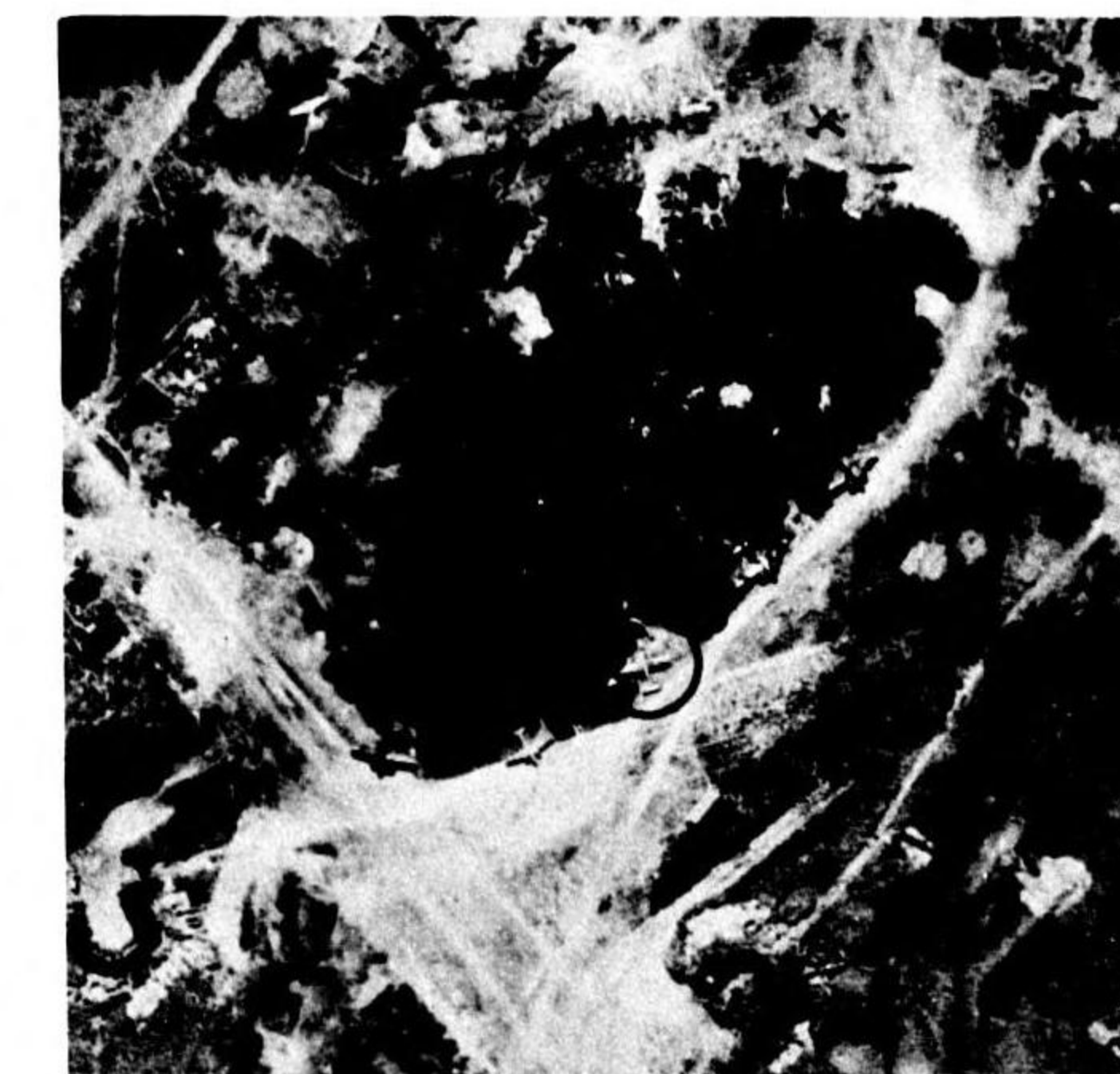


Photo Scale 1:7250

THALIA is a new coding of an old aircraft. It has been seen at various times on different fields in southeast Asia, at Hollandia, in Japan, and at Clark Field, P.I. THALIA closely resembles the Lockheed 18 "Lodestar", and is believed to be evolved from that plane.

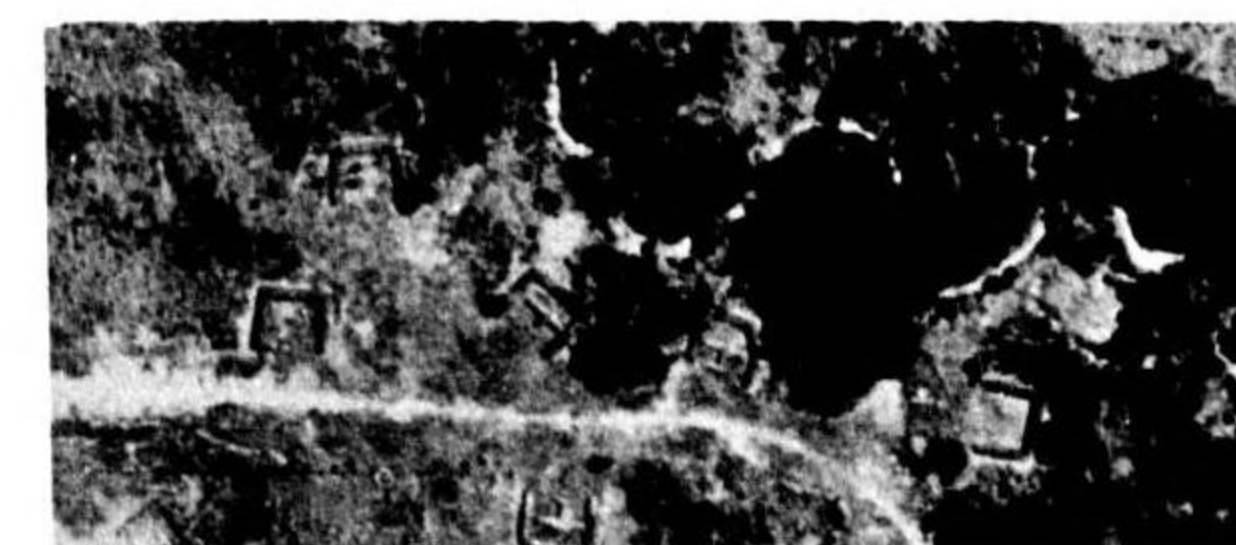
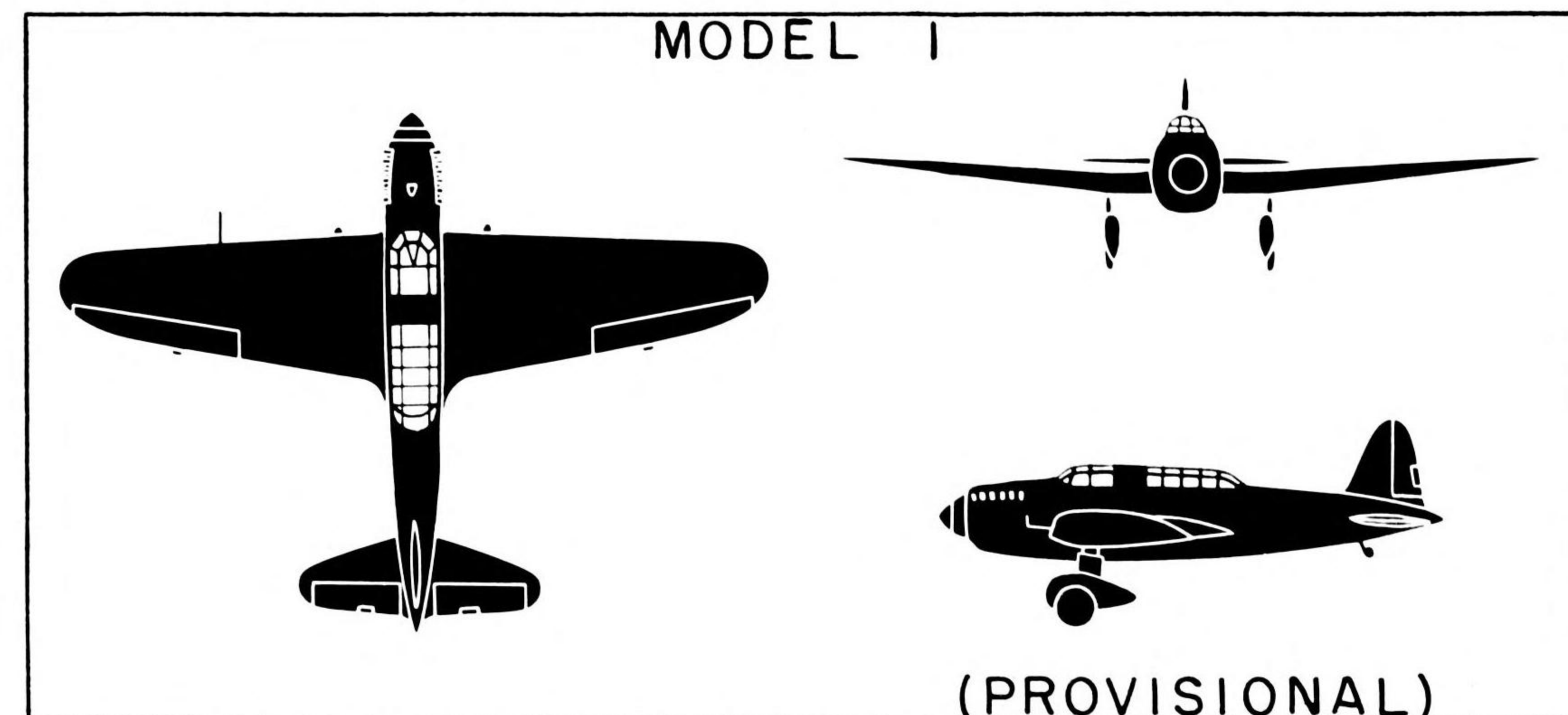
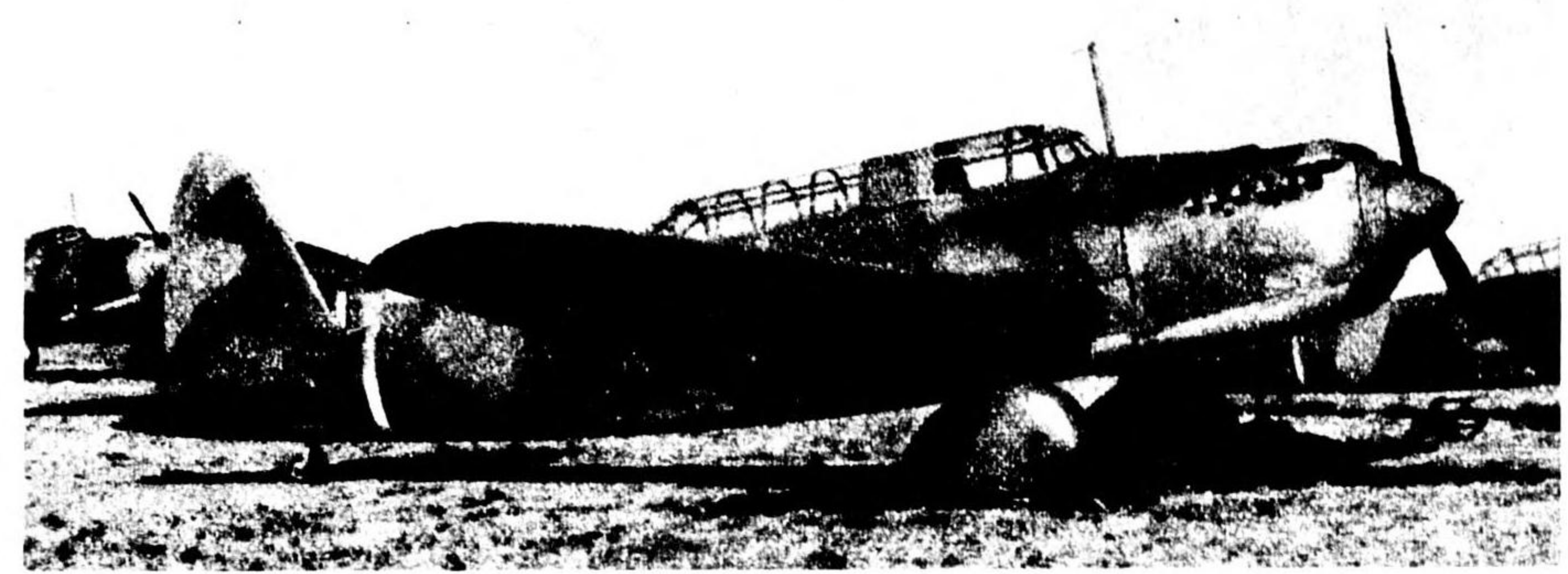


Photo Scale 1:9510

"MARY"

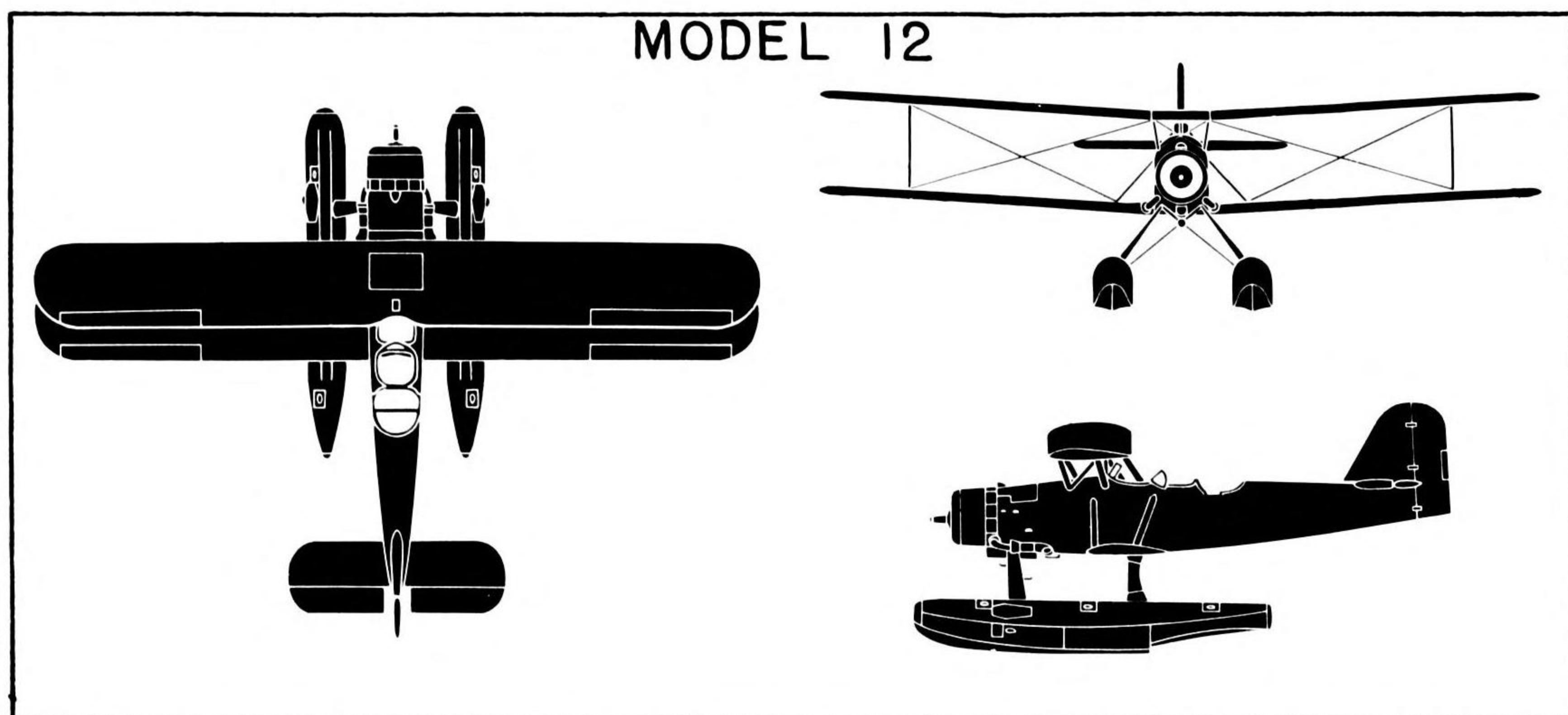


- KAWASAKI 98
- LIGHT BOMBER
- S - 47' 8"
- L - 35'



MARY is reported only occasionally from the China-Burma area where it is used as a training plane. It has also seen service as a reconnaissance plane. In plan view the squarish inline engine is easily mistaken for a radial engine.

"ALF"



- KAWANISHI 94
- RECONNAISSANCE
- S - 46' 11"
- L - 32' 7"

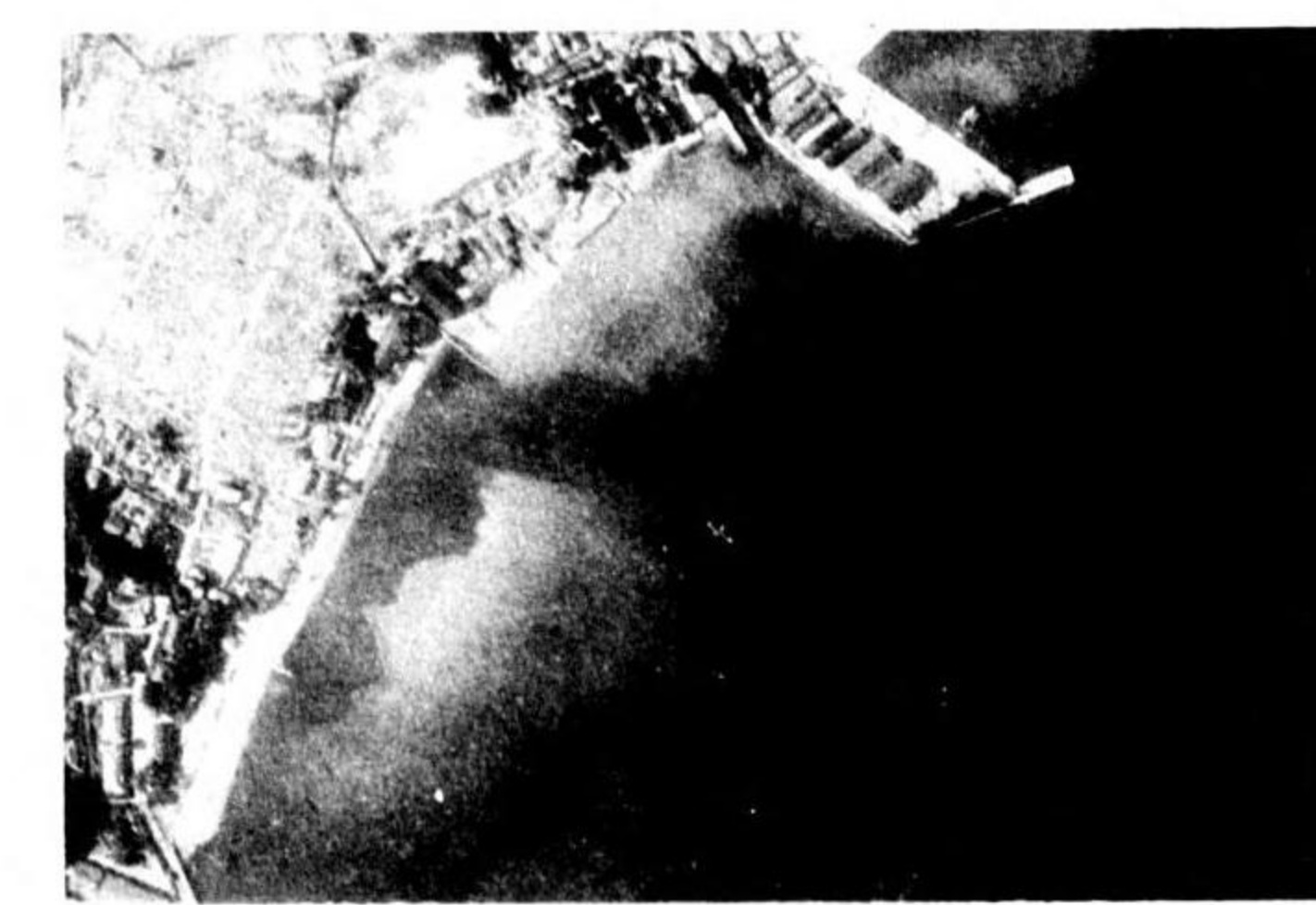
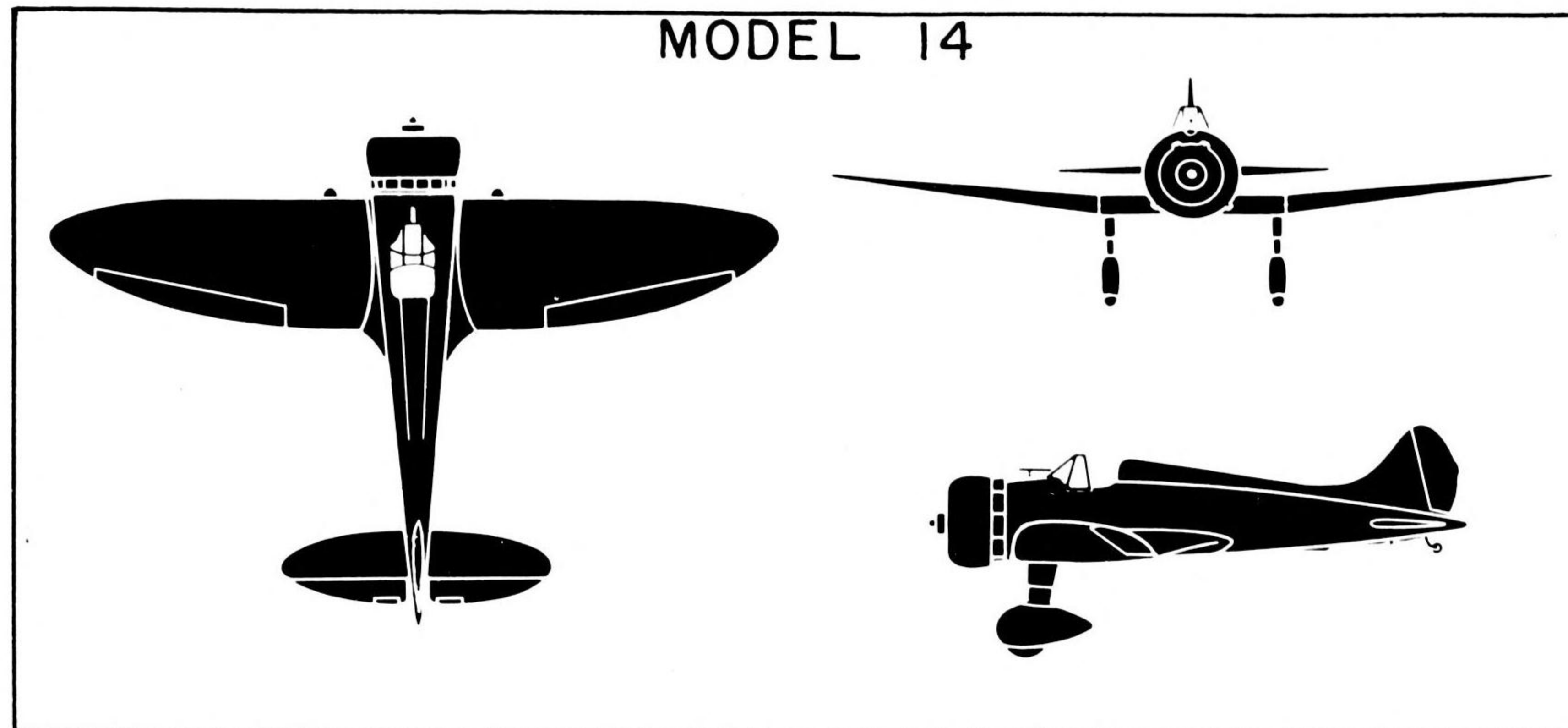


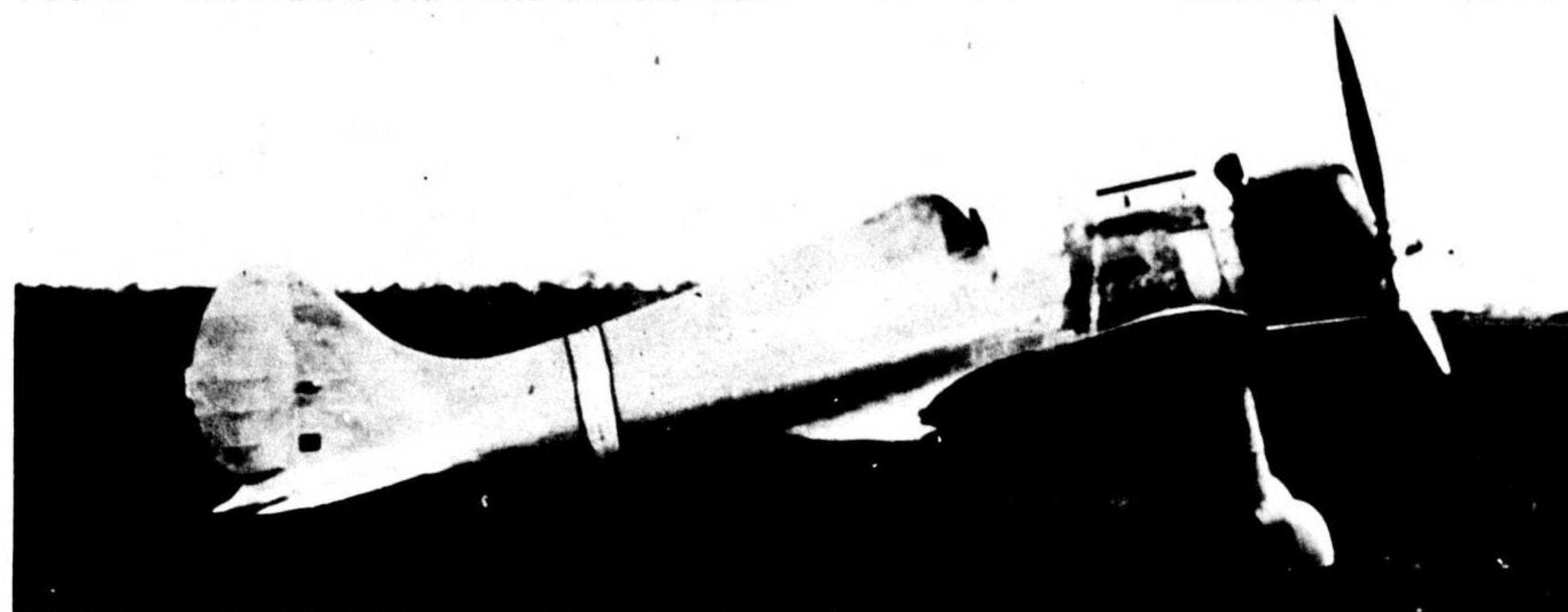
Photo Scale 1:10,050

ALF continues to see occasional usage at operational bases. The top photo shows two models, one with inline and one with radial engine. The straight features of the upper and lower wing and the squarish twin floats are distinguishing points for ALF.

"CLAUDE"



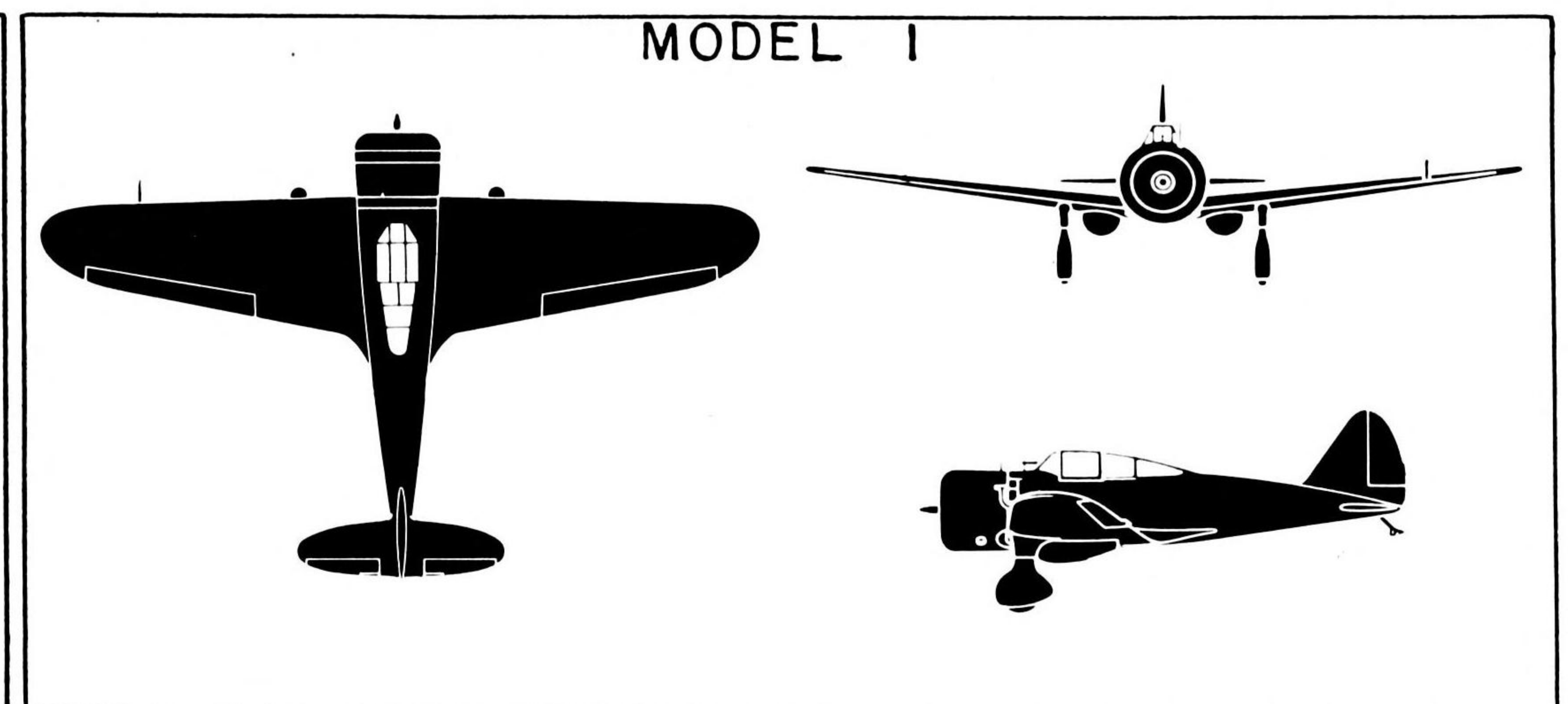
- MITSUBISHI 96 ● S - 36'
- FIGHTER ● L - 24' 7"



Prior to the adoption of the ZEKE series CLAUDE was the standard carrier-borne Navy fighter. Its present use is as a trainer. CLAUDE is distinguished by its thin, elliptical wing and tailplane surfaces.

R E S T R I C T E D

"NATE"



- NAKAJIMA 97 ● S - 36' 9"
- FIGHTER ● L - 24' 9"

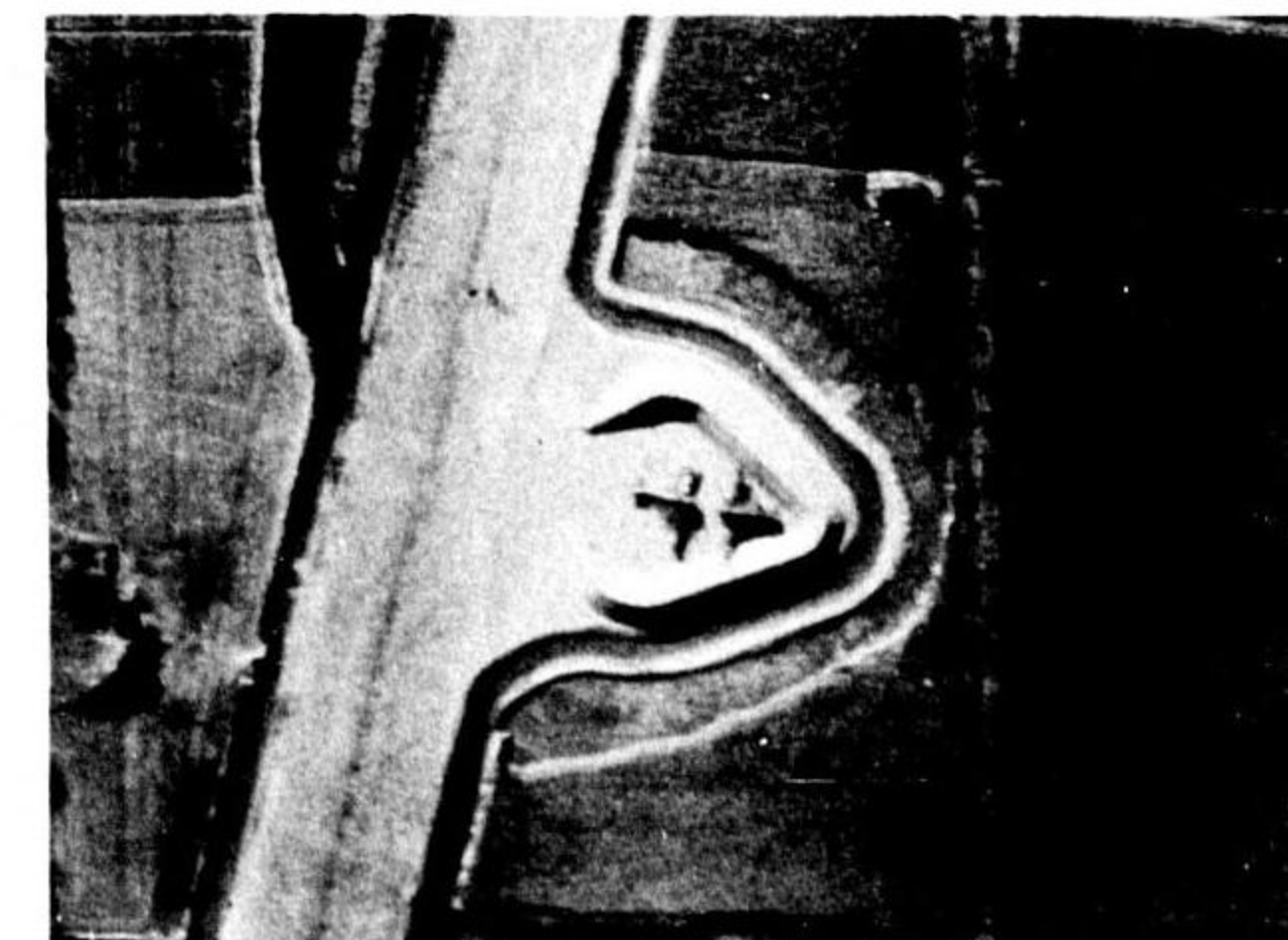
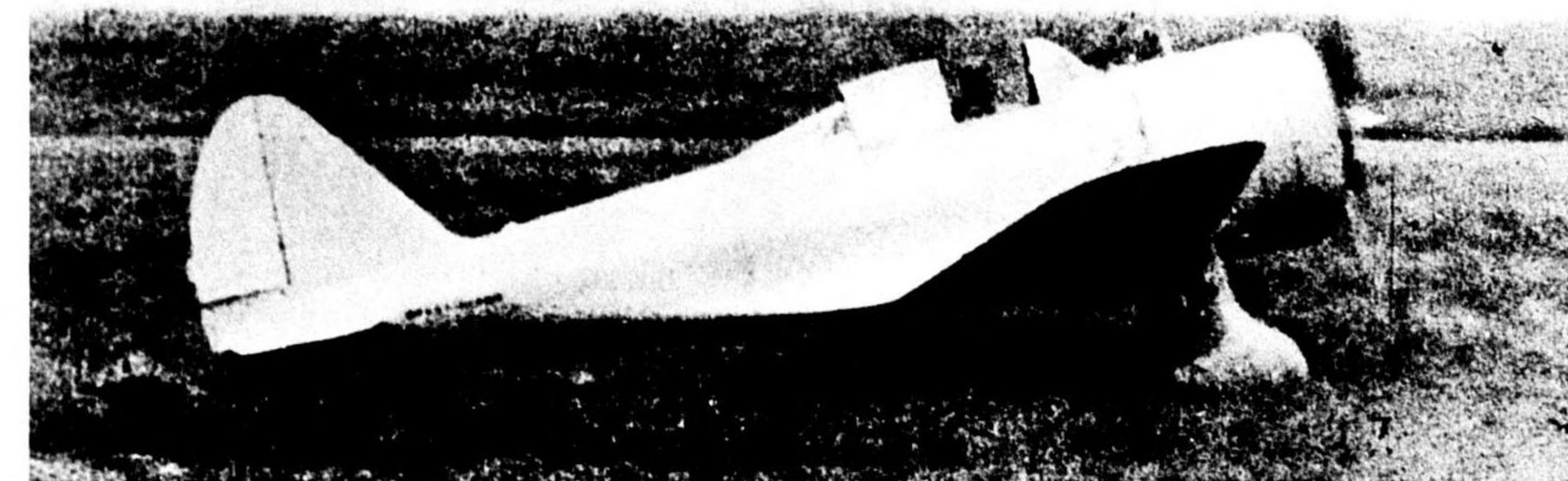


Photo Scale

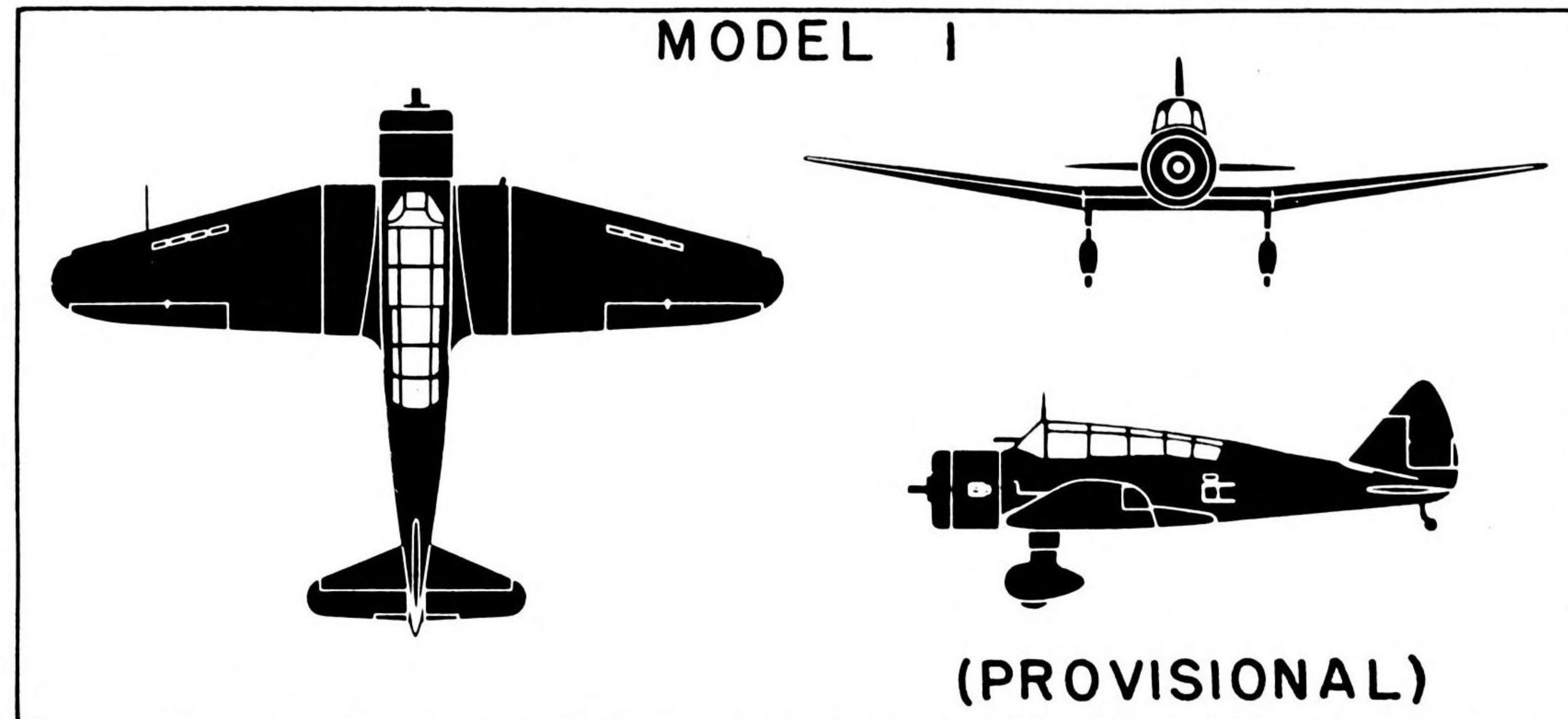
1:2800



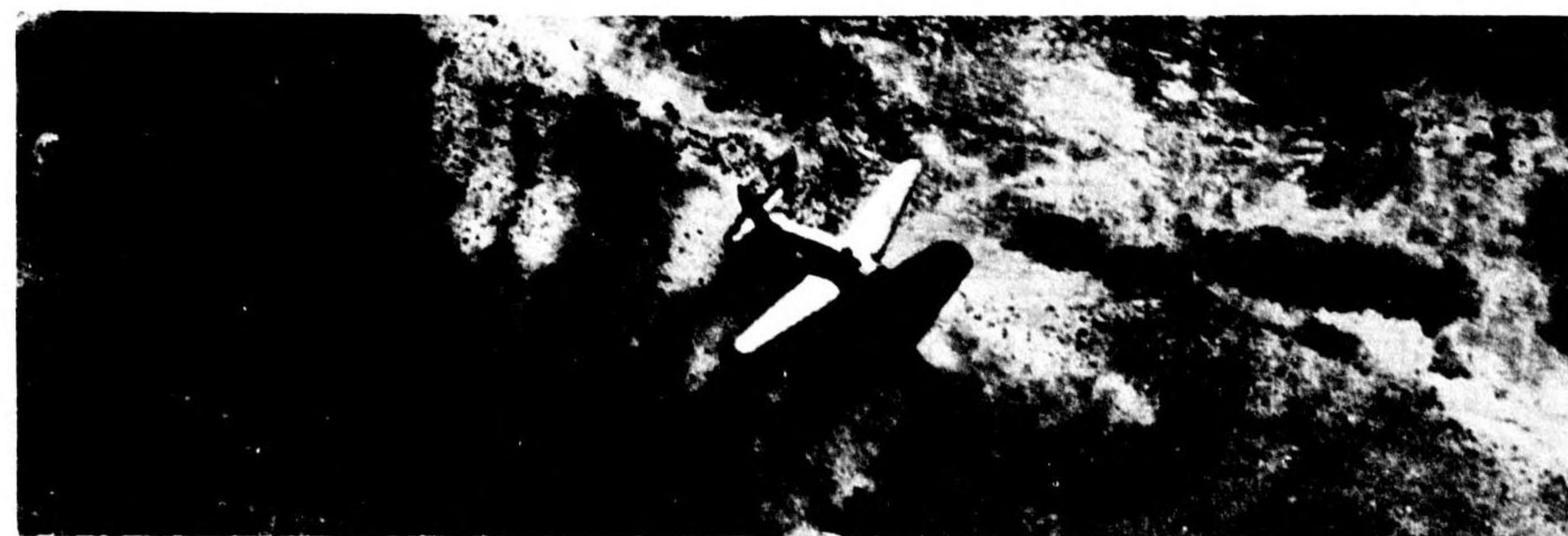
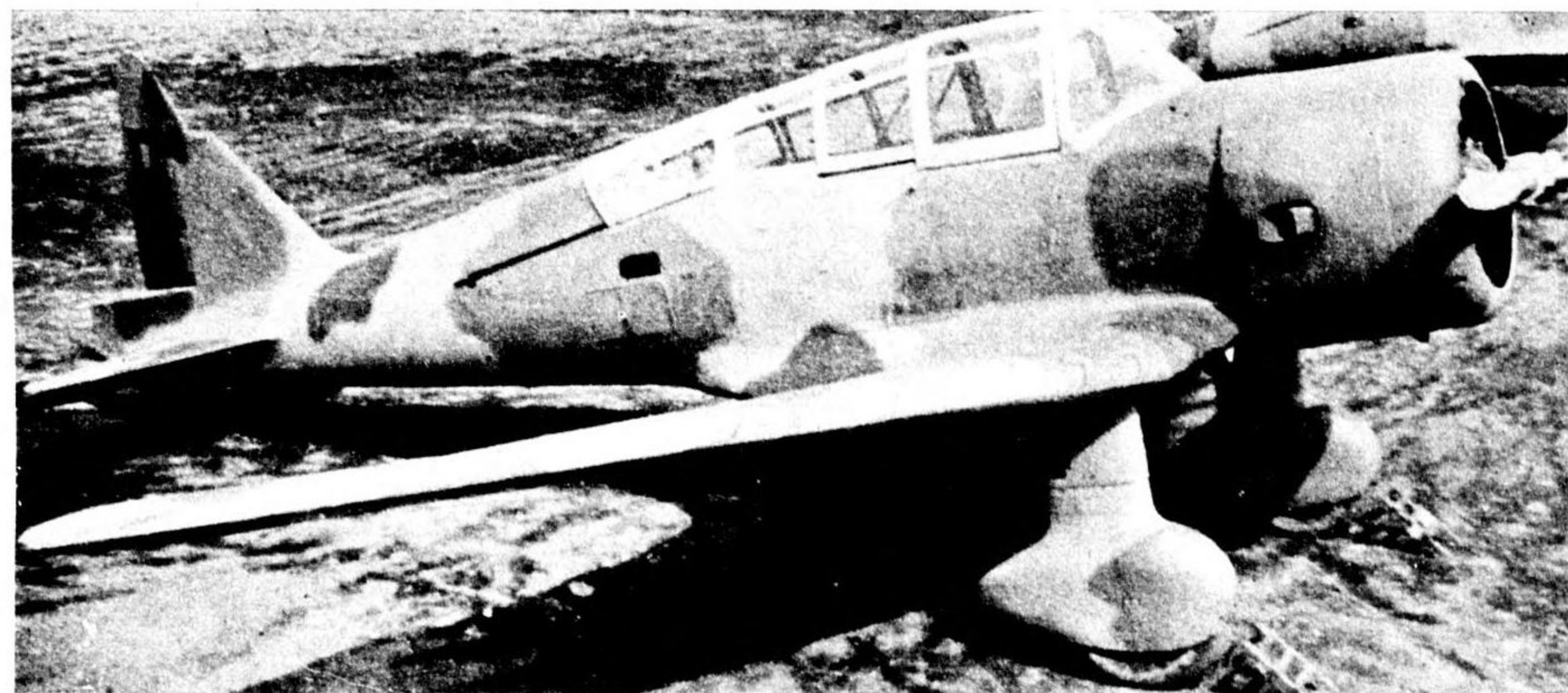
NATE is the plane from which OSCAR was developed. Its present use is as a trainer. Note the stubby radial engine, the slim wing, fuselage and tailplane - all features which have been incorporated in OSCAR as well.

5.05

"IDA"



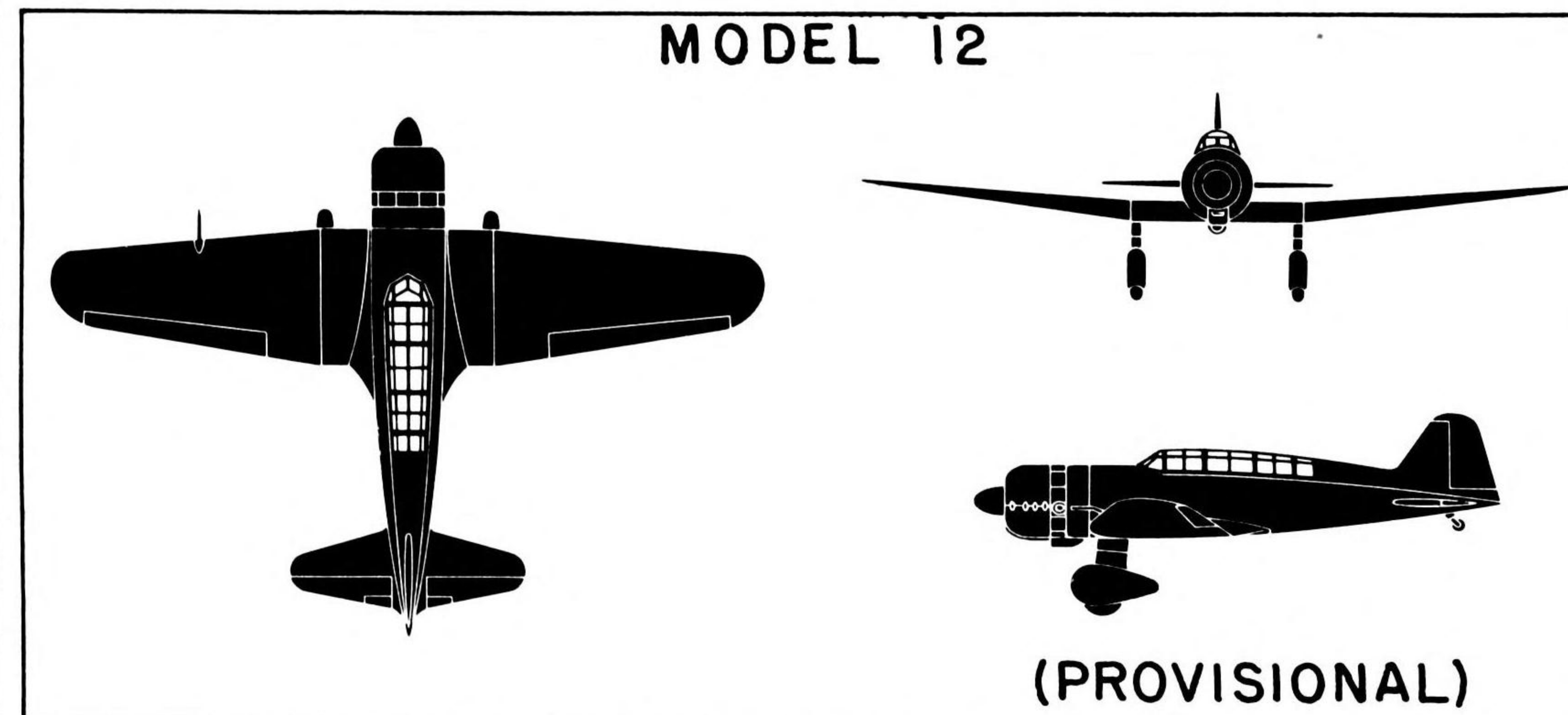
- TACHIKAWA 98 ● S - 39' 5"
- RECONNAISSANCE ● L - 27' 11"



Previous publications have given a span of 47'9" and a length of 34' for IDA, but there is no evidence to substantiate these dimensions. An uncoded type of the larger size resembling IDA has been seen recently.

At the present time IDA is being used as a trainer.

"BABS"



- MITSUBISHI 98 ● S - 39' 6"
- RECONNAISSANCE ● L - 28' 5"

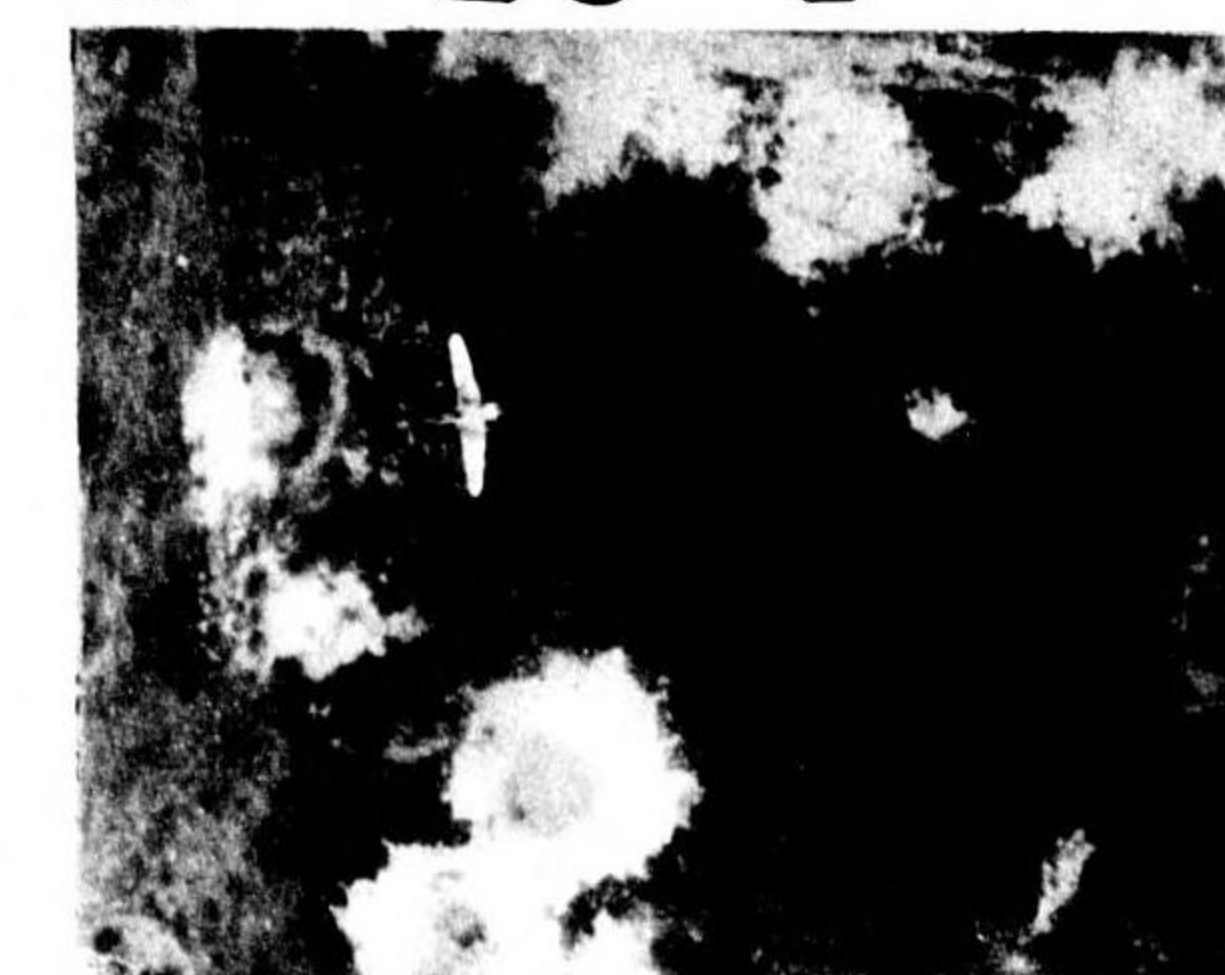
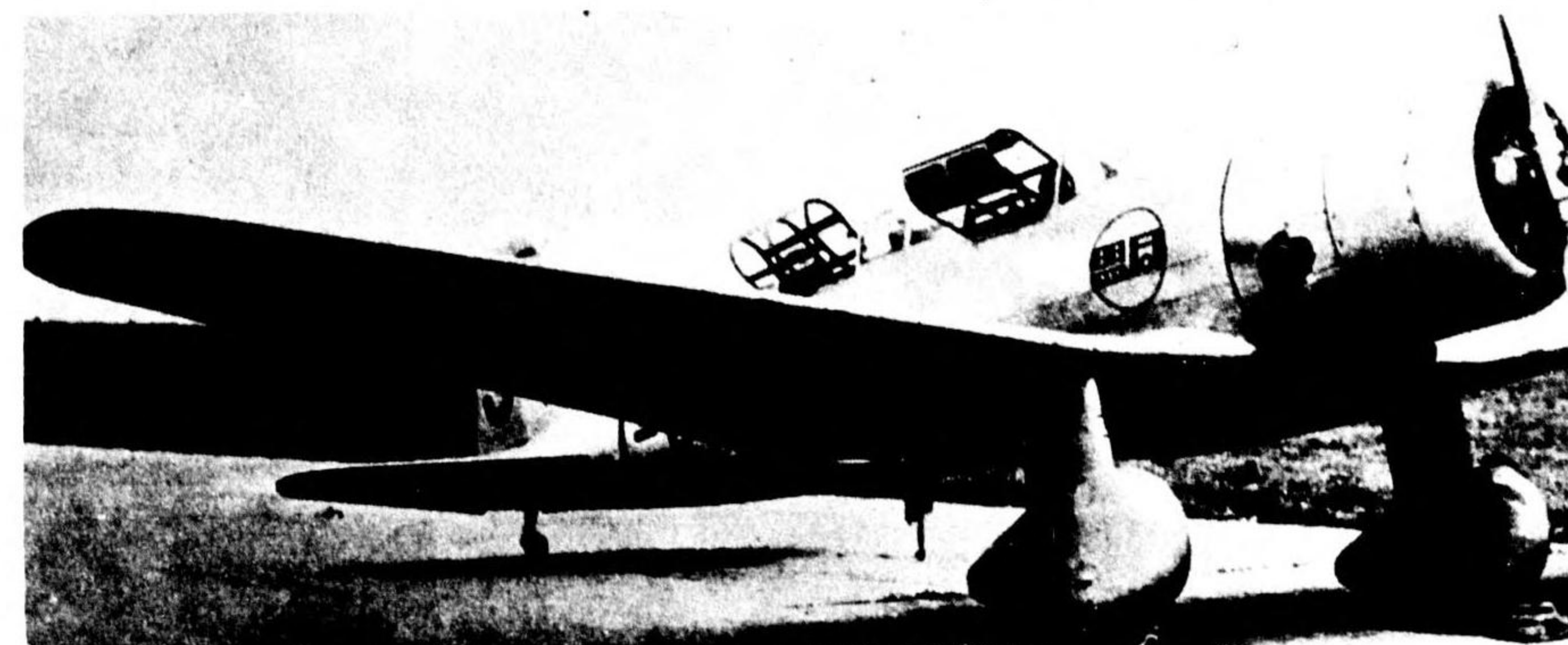


Photo Scale 1:1775
The stereogram is an early model.



BABS is a development of the commercial plane "Kamikaze" which made a record flight from Tokyo to London in 1937. The military version is seen on both Army and Navy fields in limited numbers.

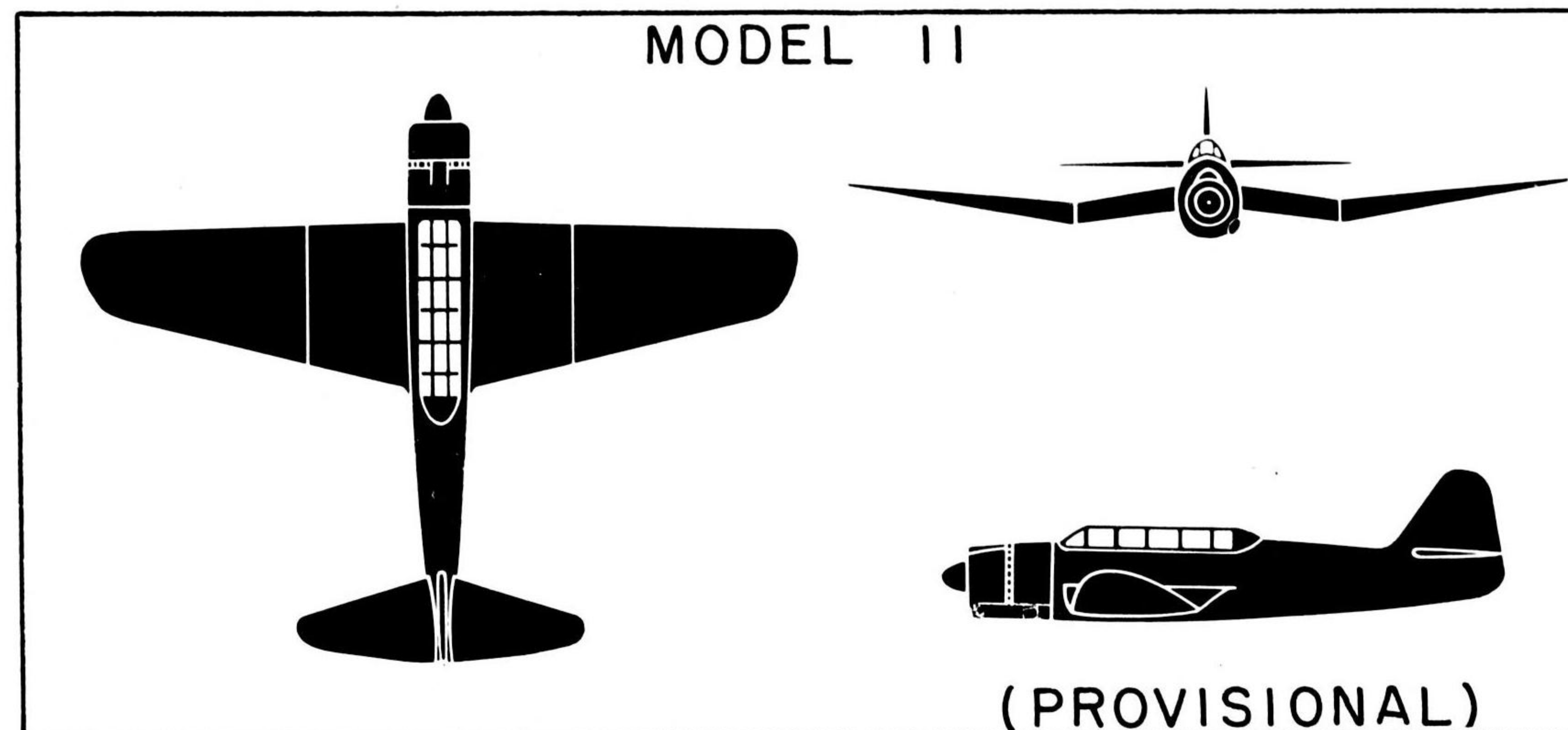
SECTION-6

6.01 6.99

NEW AIRCRAFT

RESTRICTED

"GRACE"



- AICHI
- TORPEDO BOMBER
- S - 47' 3"
- L - 37' 7"

Identification Data

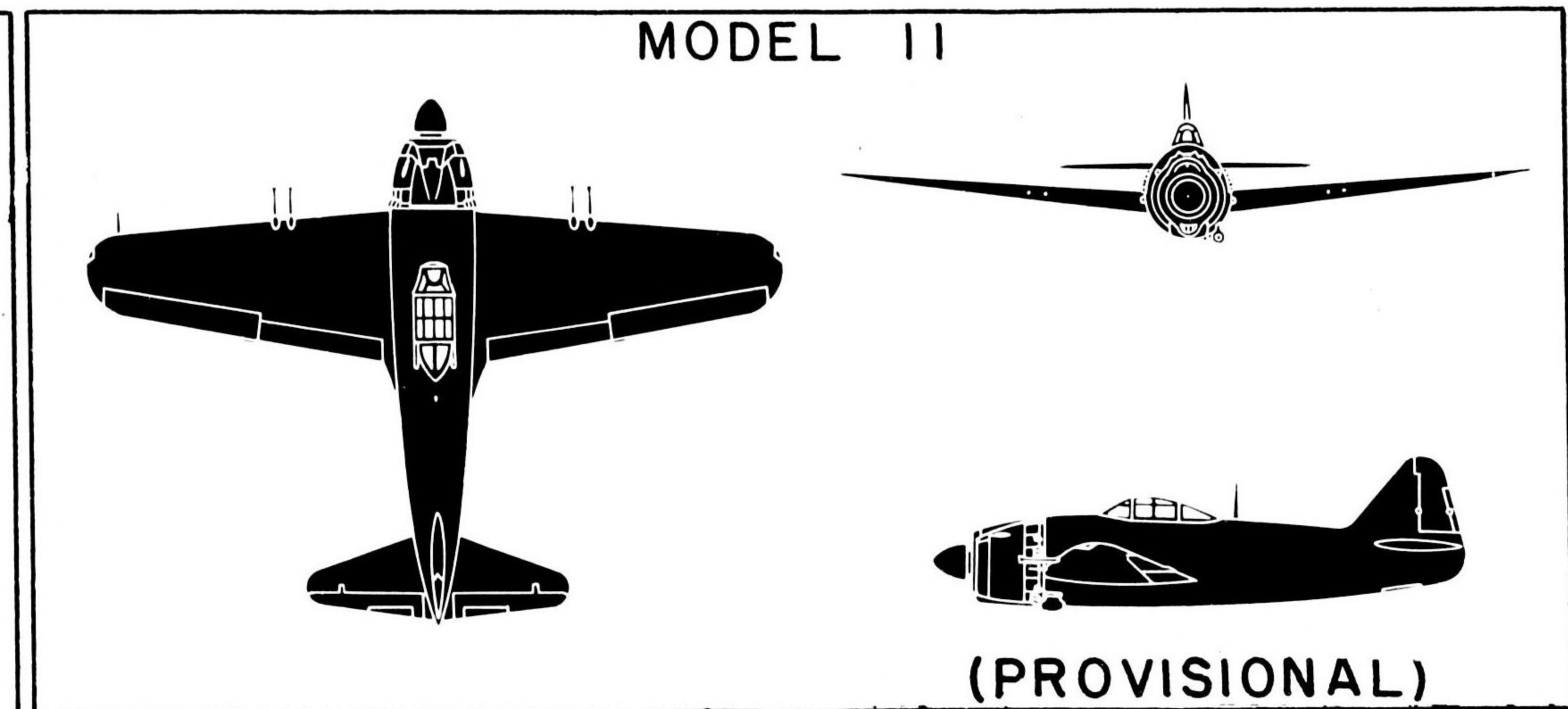
- Low mid-wing monoplane.
- Inverted gull wing with slight taper to leading edge, sharp taper to trailing edge.
- Wing tips have more rounding on trailing edge than on leading edge.
- Radial engine projects well forward of wing.
- Greenhouse slightly longer than wing root chord.
- Tailplane has sharp straight taper on leading edge, moderate curved taper on trailing edge.

GRACE reportedly will be used as a dive-bomber as well as a torpedo bomber.

The nearly straight leading edge on a plane of 47' wing span combined with a long engine should distinguish GRACE from KATE and JILL. Shadow studies indicate that there will be very little evidence of the inverted gull wing on aerial photographs.

RESTRICTED

"GEORGE"



- KAWANISHI
- FIGHTER
- S - 39' 5"
- L - 29' 7"

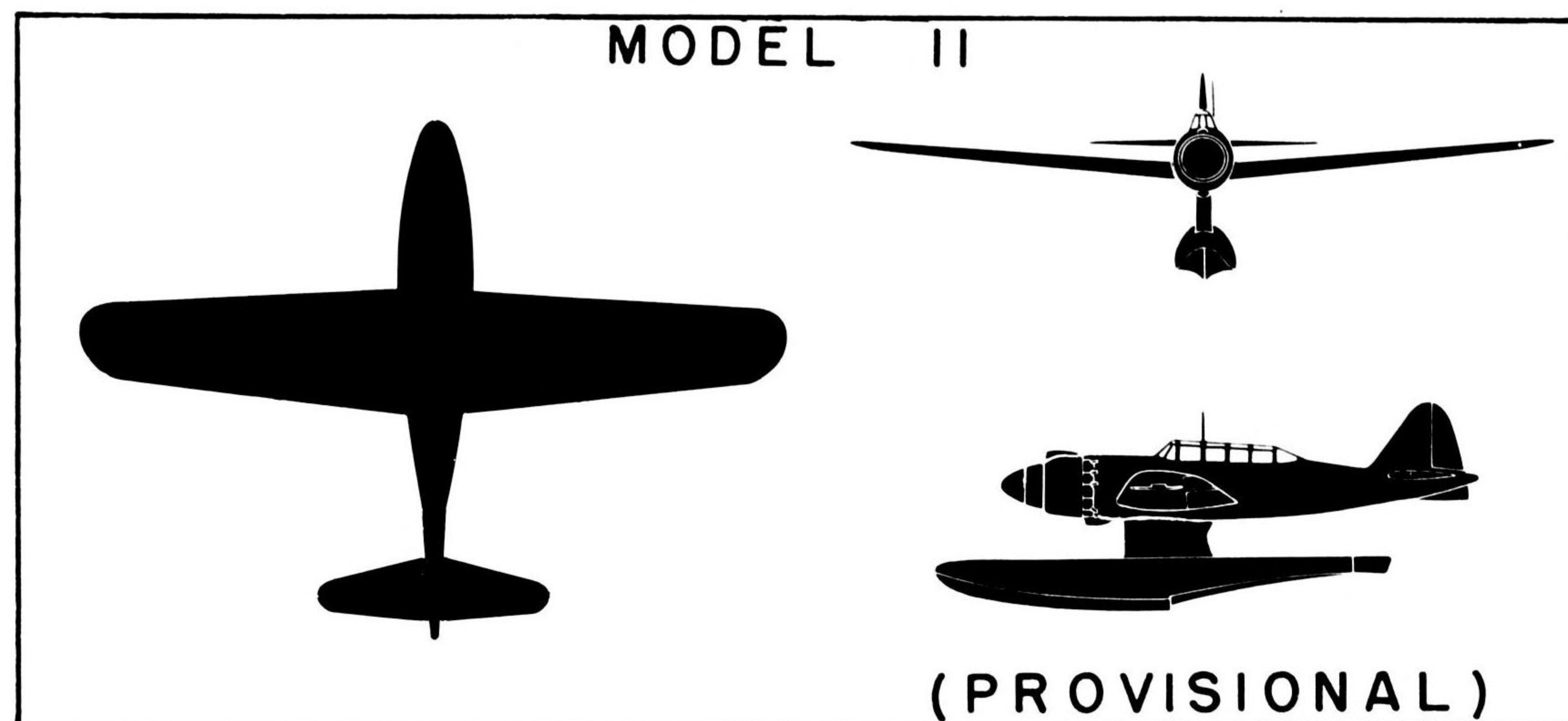
Identification Data

- Low mid-wing monoplane.
- Moderate straight taper on leading and trailing edges of wing.
- Broad, "clipped" wing tips.
- Short radial engine, tapering to a large spinner.
- Small cockpit.
- Broad tailplane with sharp taper on leading edge and moderate taper on trailing edge.
- Fin and rudder taper to broad base.

An early version of GEORGE, a new Navy fighter, is shown above. GEORGE was developed from REX, a new seaplane fighter, after flight tests showed REX to have exceptionally good performance characteristics.

Prisoner of war states that later models of GEORGE have a low wing.

"NORM"



- KAWANISHI
- RECONNAISSANCE
- S - 45' 11"
- L - 37' 2"

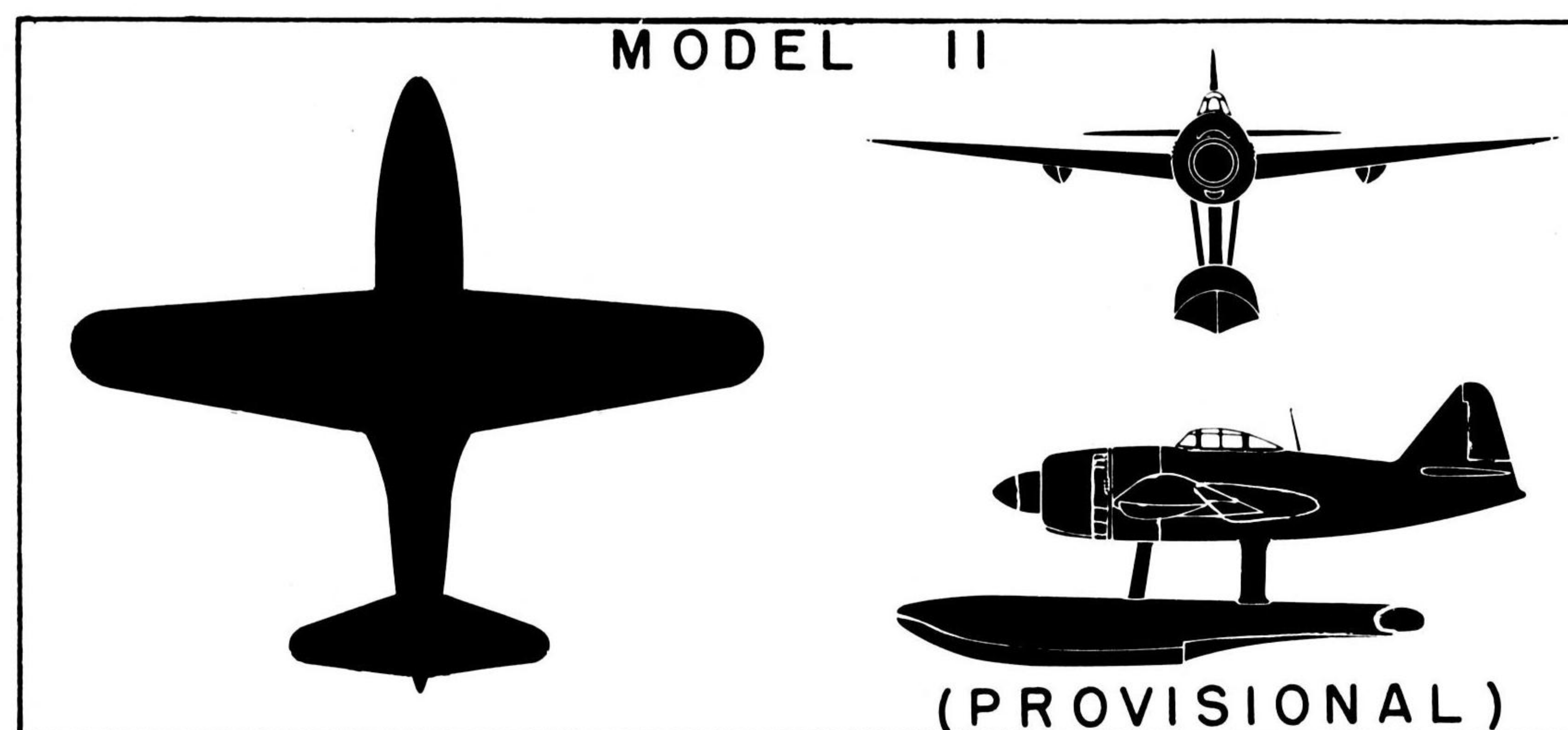
Identification Data

- Single-float, low mid-wing monoplane.
- Wing of moderate taper, with slightly more taper on trailing edge than on leading edge, rounded tips.
- Radial engine with very large spinner.
- Leading edge of tailplane has sharp taper, trailing edge a slight taper.
- Greenhouse extends from center of wing to midway between trailing edge of wing and leading edge of tailplane.
- Small wing floats fold inboard beneath wing.

Note the attachment of the float to the fuselage. The central float and the wing floats reportedly can be jettisoned in case of emergency.

The large size of NORM puts it into a class with JAKE and PAUL. Both JAKE and PAUL, however, have twin floats while NORM will be the largest single-float seaplane in operation. ALF, also of similar size, is a biplane with twin floats.

"REX"



- KAWANISHI
- FIGHTER
- S - 39' 5"
- L - 35' 5"

Identification Data

- Single-float, low mid-wing monoplane.
- Moderate straight taper on leading and trailing edges of wing.
- Broad, "clipped" wing tips.
- Short radial engine, tapering to a large spinner.
- Small cockpit.
- Broad tailplane with sharp taper on leading edge, moderate taper on trailing edge.
- Small wing floats fold inboard beneath the wing.

REX may be confused with RUFÉ as both planes are of similar size and have central floats. Note the mid-wing construction and large spinner on REX, however. There is a slight projection aft of the tailplane on REX.

MISCELLANEOUS

In addition to the four new aircraft shown on the two preceding pages, code names have been assigned to seven other aircraft on which no provisional sketches or silhouettes are available. These planes are discussed below.

LUKE II

LUKE is a single-engine Naval fighter plane being manufactured by Mitsubishi. It is unusual in that it is a twin-boom plane and utilizes a "pusher" type of engine. No other information is available as to design or dimensions.

LUKE reportedly has an "emergency" speed of 437mph. It accommodates one man and can carry two small bombs. LUKE is scheduled to become operational within a few months but it is likely that manufacturing complications will develop due to its unusual design.

SAM II

SAM is a single-engine Naval fighter plane being manufactured by Mitsubishi. It is designed as a carrier-borne plane and is expected to replace the ZEKE series. It is believed to be in operation at the present time but has not been reliably identified.

SAM has been described as a low-wing monoplane capable of 400mph. A captured notebook credits SAM with a span of 36' 1" and a length of 29' 6"

ROB I

ROB is a single-engine Army fighter plane. The manufacturer is Kawasaki. No definite information is available as to design or dimensions nor is it known when the plane may be expected in an operational state.

ROB will have an inline-engine, possibly a tandem arrangement of the engine used in both TONY and JUDY. A captured document credits ROB with a speed in excess of 500mph. This figure is believed to be highly optimistic.

STEVE I

STEVE is a single-engine Army fighter plane. It is listed as a Type 3 and, therefore, should be expected in an operational state at an early date. So far, no production status has been established. The manufacturer is uncertain, possibly Nakajima.

STEVE has been described as a "super-high-speed fighter". Its performance is expected to be comparable to that of FRANK. No information is available as to design or dimensions.

PATSY I

PATSY is a twin-engine Army bomber and reconnaissance plane manufactured by Tachikawa. No definite information as to design, dimensions, or stage of development is available.

Early information indicated that the plane described above was a single-engine, long-range fighter and the code name PAT was assigned. More recent information indicates that the plane is a twin-engine bomber-recce type, so the name PAT has been withdrawn and PATSY I assigned.

CLARA I

CLARA is a twin-engine Army plane to be used for headquarter reconnaissance duty. The manufacturer is Tachikawa. CLARA may be in production at this time. No information is available as to design or dimensions.

EDNA I

EDNA is a twin-engine Army headquarter reconnaissance plane. It may be in production at this time, being manufactured by "Air Depot". No information is available as to design or dimensions.

As additional information or definite photography becomes available on the aircraft types shown in this section, supplementary sheets will be issued.

PUBLICATIONS PREPARED AND AVAILABLE

AT U. S. NAVAL PHOTOGRAPHIC INTELLIGENCE CENTER

● JAPANESE PILLBOXES	FEB. 1944	UNDERWATER DEPTH DETERMINATION	OCT. 1944
JAPANESE CAMOUFLAGE	MAY 1944	JAPANESE ELECTRONICS	JAN. 1945
JAPANESE AIRCRAFT SHELTERS	MAY 1944	JAPANESE MILITARY BUILDINGS	JAN. 1945
JAPANESE SUPPLY DUMPS	JUNE 1944	JAPANESE AA CD GUNS.	FEB. 1945
JAPANESE LANDING CRAFT	OCT. 1944	BEACH INTERPRETATION	FEB. 1945
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● PHOTOGRAPHIC INTERPRETATION HANDBOOK	APRIL 1944	THE COKE, IRON, AND STEEL INDUSTRIES	SEPT. 1944
THE PETROLEUM INDUSTRY	JULY 1944		

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THE SUGAR AND ALCOHOL INDUSTRIES

THE MAGNESIUM INDUSTRY

● pending revision