N-156

LIMITED WAR

FIGHTER

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FIGHTER

NORTHROP CORPORATION | NORAIR DIVISION

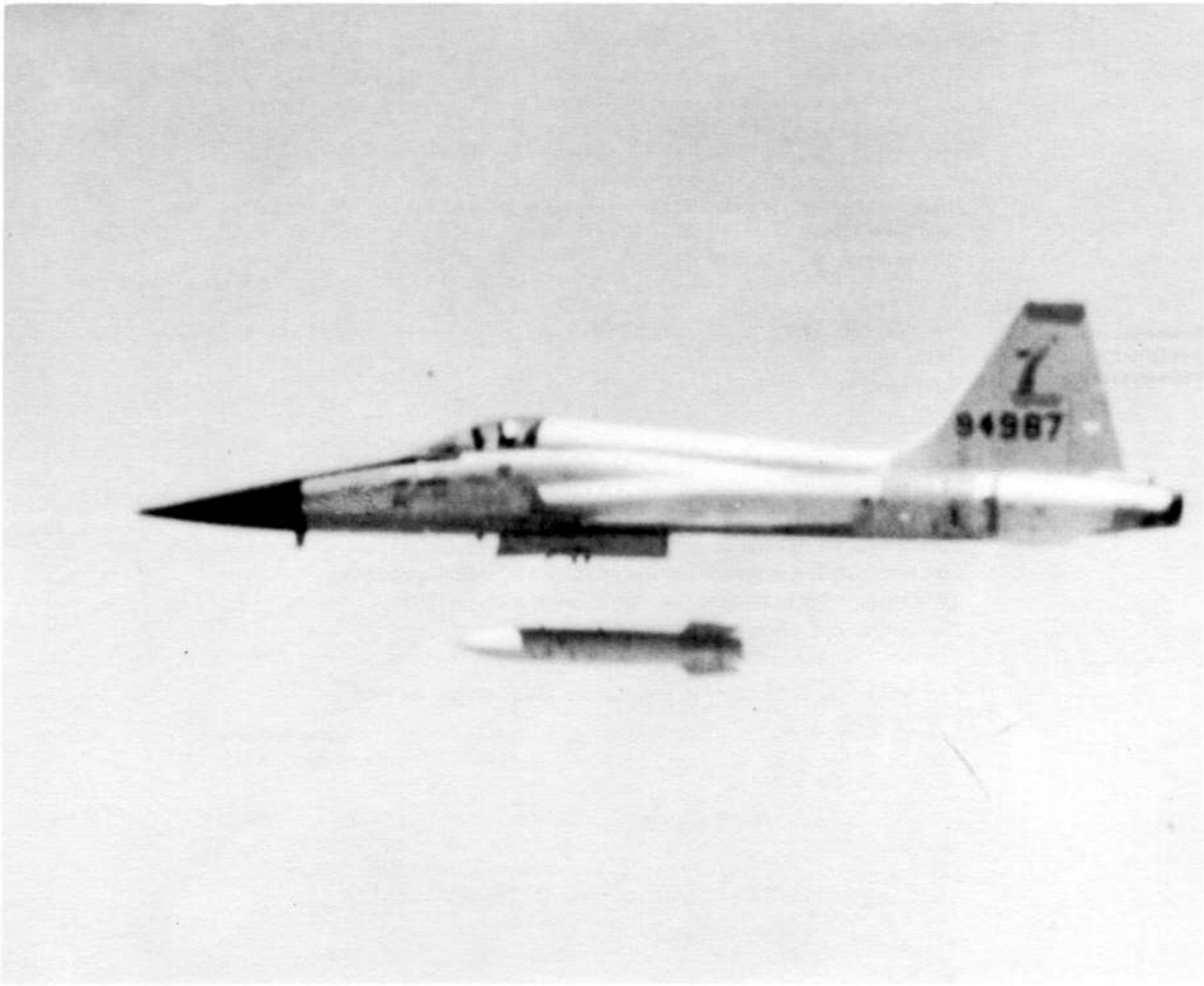
INTRODUCTION

In answer to the need for a new limited war fighter optimized to provide high mission performance with reduced complexity, the Northrop Corporation has developed the N-156 limited war fighter under contract to the U. S. Department of Defense. The very nature of limited war demands that aircraft designed to meet its requirements be capable of penetrating enemy territory with a variety of air-to-ground and air-to-air weapons, as well as reconnaissance and surveillance equipment. Also, the fighter must be capable of rapid deployment overseas, operation from short and unprepared fields, ease of maintenance and logistic support under adverse conditions, and rapid turnaround between missions. Further, the cost of these aircraft must be low — both to procure and to operate — such that sufficient quantities can be available for deployment simultaneously to multiple limited war "hot spots" around the world.

Northrop recognized that these requirements could not be met in one design without the exploitation of the most advanced technologies in the fields of propulsion, aerodynamics, and structures. The N-156 was made possible only by employing the high thrust-to-weight-ratio, low fuel consumption, General Electric J-85 engines, together with area-rule design and efficient, rugged structures. The combination of these advanced technologies has resulted in a developed limited war fighter possessing a large load carrying capability over long ranges, short field characteristics, excellent maneuverability and handling characteristics, and supersonic speed for combat or evasive action. The use of two engines provides a level of safety and reduced attrition which cannot be approached by single engine fighters.

In the N-156 design, high concentration has been placed on those factors which, taken together, permit the maximum mission effectiveness of a force of aircraft. These factors are: high individual performance and effectiveness of each unit, large numbers of aircraft available within allocated funds due to low procurement and operation costs, and high in-commission rate due to ease of maintenance and high reliability.

The N-156 has achieved a unique combination of performance and simplicity, making it ideally suited to effective limited war operations. First flown in July 1959, the N-156 is developed, and ready for immediate production. Production deliveries are available 14 months from date of contract.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PAYLOAD

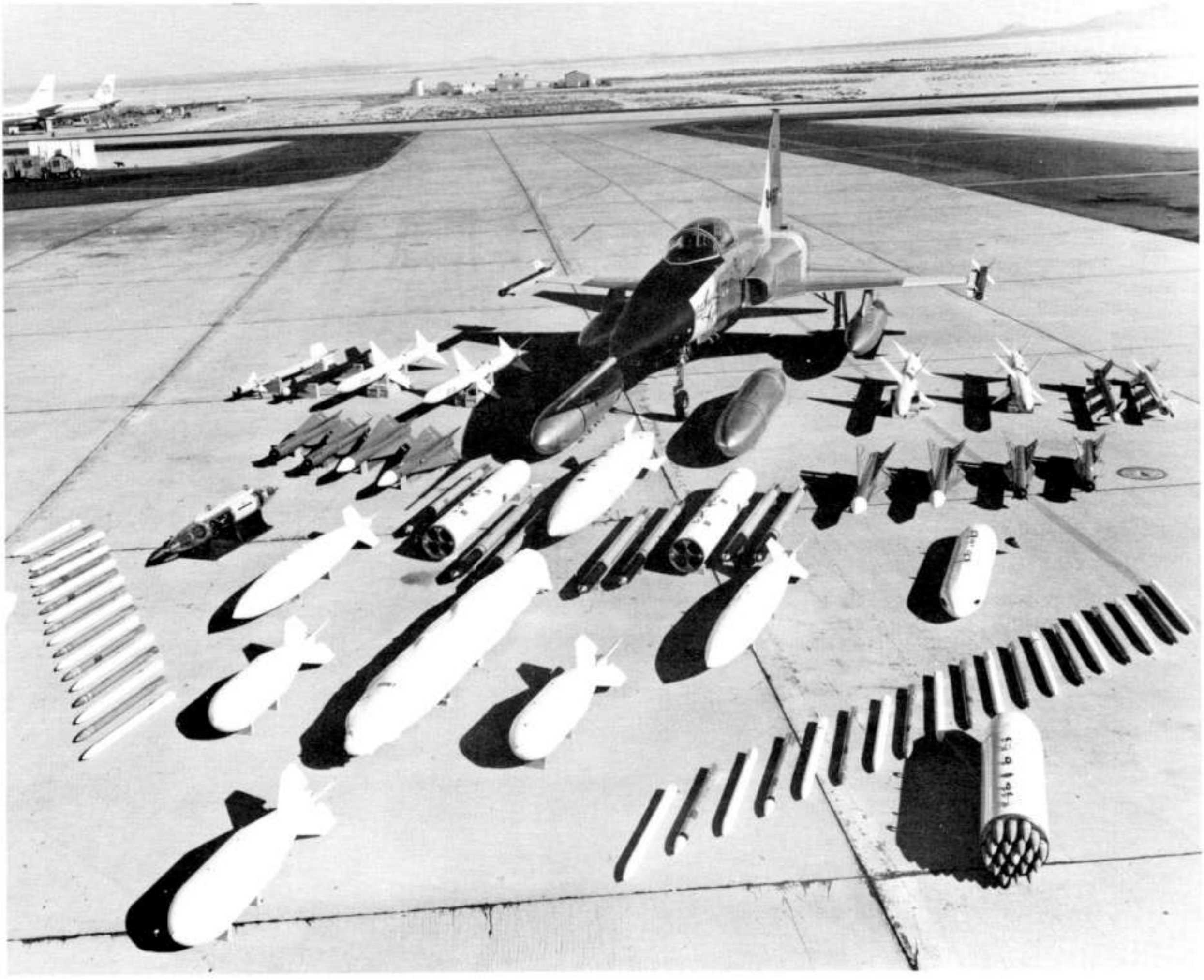
FIVE EXISTING STORE STATIONS FOR EXTERNAL PAYLOADS UP TO 5200 POUNDS*

Bombs (HE, Nuclear, or Napalm)
Rockets
Missiles (Air-to-Ground or Air-to-Air)
Guns
Reconnaissance Pods
Fuel

FORTY CUBIC FEET INTERNAL SPACE PROVIDED FOR ANY DESIRED ARMAMENT DELIVERY AND NAVIGATION SYSTEM

Clear Weather Air-to-Ground and Air-to-Air, and Instrument Navigation
Radar-Assisted Air-to-Ground and Air-to-Air, and Navigation
All-Weather Air-to-Ground and Air-to-Air, and Inertial Navigation and Ground Mapping

* Two additional stations (650 pounds per station) can be readily incorporated.



QUICK-REACTION TO LIMITED WAR SITUATIONS

1650 Nautical Mile Unrefueled Ferry Range Permits Deployment Over 83 Percent of Existing Military Air Transport Service Routes

2790 Nautical Mile Ferry Range With a Single Refueling in Flight Permits Use of Any Military Air Transport Service Ferry Route

DEPLOYMENT

A TASK FORCE OF N-156 FIGHTERS SUPPORTED BY KC-135 TANKER/CARGO AIRCRAFT CAN RAPIDLY DEPLOY TO ANY POTENTIAL "HOT SPOT" IN THE WORLD, COMPLETE WITH CREW, MINIMUM SUPPORT EQUIPMENT, AMMUNITION, AND FUEL FOR IMMEDIATE OPERATIONS

For example, deployment from USA to Thailand of 25 N-156 fighters, refueled in flight and supported by two KC-135's

Task force arrives Bangkok in 20 hours elapsed time, with sufficient fuel and ammunition to immediately conduct 28 N-156 missions

Continuous N-156 operations are maintained through KC-135 resupply shuttle runs between Clark Air Force Base (Philippines) and Bangkok

One KC-135 shuttle run provides fuel and ammunition for 29 N-156 missions

Normal utilization of the two KC-135's on shuttle runs can provide supplies for over 100 N-156 missions per day

A similar type of N-156 task force deployment can be performed with support provided by the C-130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MISSIONS

CLOSE SUPPORT (TYPICAL)

High Altitude

200 Nautical Mile Radius
Plus 60 Minutes on Station

515 Nautical Mile Radius
Plus 5 Minutes Combat

Sea Level

250 Nautical Mile Radius
Plus 5 Minutes Combat

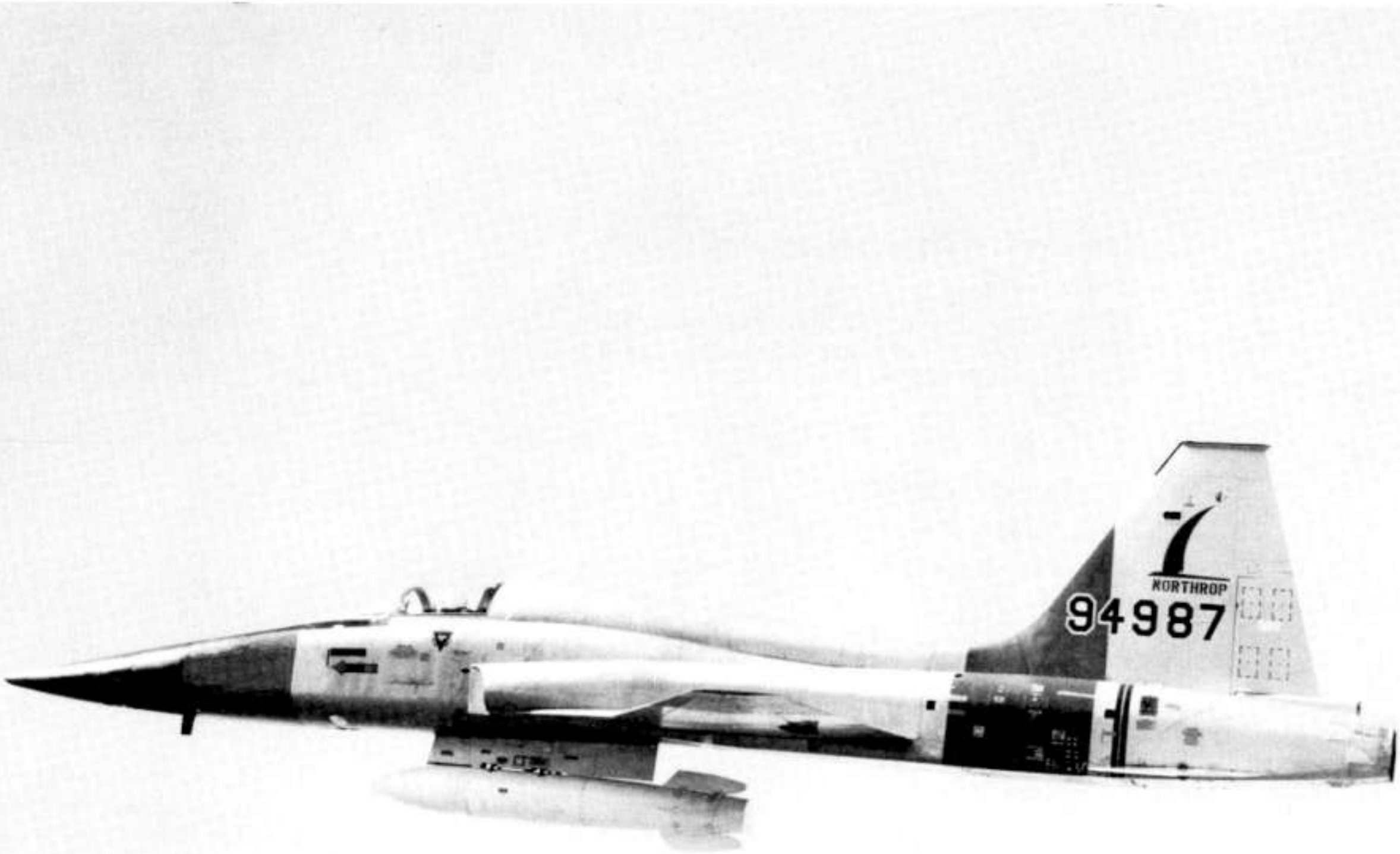
RECONNAISSANCE AND SURVEILLANCE (TYPICAL)

Visual

High Altitude — 725 Nautical Mile Radius
Sea Level — 275 Nautical Mile Radius

Photo, IR, Radar

High Altitude — 630 Nautical Mile Radius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OPERATION FROM SHORT FIELDS

Takeoff Roll

@ Minimum Weight (2 Tons Payload & Fuel) ..... 1300 Feet
@ Maximum Weight (4-1/2 Tons Payload & Fuel) ..... 2900 Feet

Landing Roll

@ Normal Landing Weight ..... 1600 Feet

FIELDS

OPERATION FROM

Unprepared Ground
Compacted Soil
Landing Mats


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TURNAROUND

RAPID TURNAROUND SERVICING BETWEEN MISSIONS DUE TO LIGHTWEIGHT, FUNCTIONAL DESIGN

Fuel Consumption Less Than Half That of Contemporary Fighters

Access Panels Over 25 Percent of Fuselage Skin

Ground Level Crew Access for Servicing

Single-point Pressure Refueling

Self-contained Cartridge Starter

TOTAL TURNAROUND TIME — 7-1/2 MINUTES, INCLUDING REFUELING AND REARMING (DEMONSTRATED)


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MAINTENANCE

DESIGNED FOR LOW MAINTENANCE FORWARD-AREA OPERATIONS IN LIMITED WAR SITUATIONS

Simple, Small, Lightweight Ground Equipment

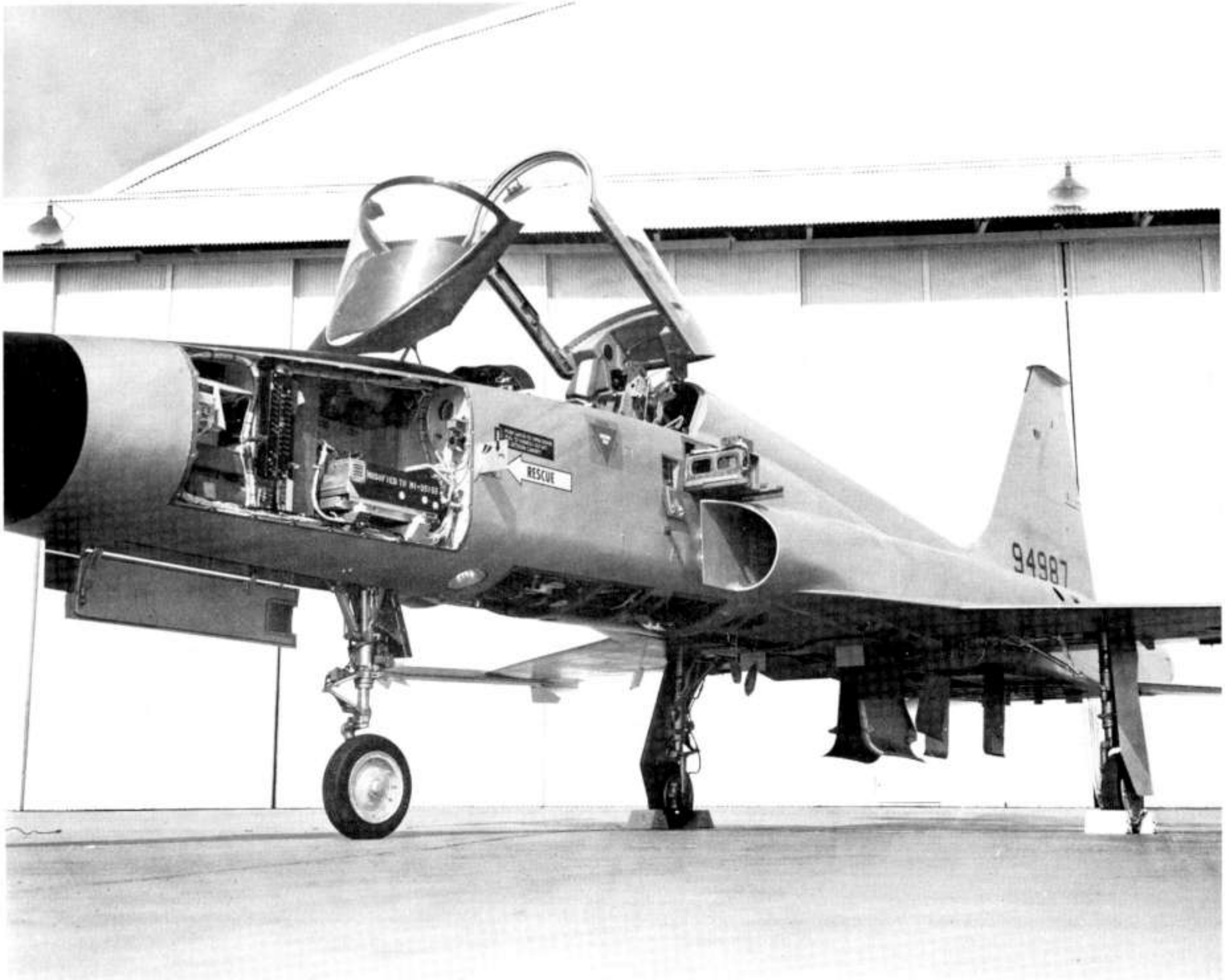
No Special Maintenance Tools Required

Simplified Maintenance and Service Procedures

LOW COMPARATIVE MAINTENANCE INDEX

N-156: 16 Manhours/Flight Hour

Contemporary Fighters: 40-65 Manhours/Flight Hour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FLIGHT SAFETY THROUGH TWIN ENGINE RELIABILITY

Single Engine Return From Mission

Burst Acceleration

Supersonic Escape

SAFETY

SINGLE ENGINE PERFORMANCE

Comparable to Performance of Operational Subsonic Fighter and Attack Aircraft

TWIN ENGINE DESIGN

Conforms to Air Force and Navy Practice of Procuring No New Single Engine Fighter Configurations


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ECONOMICS

N-156 HAS COMPLETED ITS FUNDED DEPARTMENT OF DEFENSE DEVELOPMENT PROGRAM

OVER 3000 N-156/T-38 FLIGHT HOURS

PARALLEL PRODUCTION WITH T-38

T-38 in Quantity Production for USAF
Over 700 Aircraft Currently Programmed
Extensive N-156/T-38 Similarity & Interchangeability
Cost Benefits Derived from Concurrent N-156/T-38 Production

LOW COST MAINTENANCE AND OPERATION

Maintenance and Fuel Costs Less Than Half Those of Contemporary Fighters
Low Attrition Because of Twin Engine Safety

N-156 IS AVAILABLE AT A LOW, *FIXED* PRICE


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NATION-WIDE N-156/T-38 PRODUCTION PROGRAM

52.7 Percent of Dollar Volume Subcontracted

56.5 Percent to Small Business Concerns

46.4 Percent in Labor Surplus Areas

PRODUCTION

MAJOR PROGRAM SUPPLIERS

Adel Precision Products, Calif.
Advance Gear & Machine, Calif.
Aeroquip, Mich.
Airborne Accessories, New Jersey
AiResearch, Calif.
ALCOA, Tenn.
Amphenol-Borg, Ill.
Bendix, Calif. & Iowa
Bertea Products, Calif.
Cannon Electric, Calif. & Ariz.
Cutler-Hammer, Wisc.
Thomas A. Edison Industries, New Jersey
ESNA, New Jersey
Firewel Co., New York
General Electric, Mass., Ohio, & Canada
Kearfott, New Jersey
Kollsman Industries, New York
B. F. Goodrich, Calif.
Goodyear Aircraft, Arizona
Grimes Mfg., Ohio
Hamilton Standard, Conn.
Hart Mfg., Conn.
Houdaille Industries, New York
Kaiser Aluminum, Calif.
Kohler Aircraft Products, Ohio
Ladish Co., Wisc.
Leach Corp., Calif.
Lear Inc., Ohio
Liquidometer Corp., New York
H. W. Loud Machine Works, Calif.
Minneapolis-Honeywell, Minn.
New York Air Brake, New York
Parker Aircraft, Calif.
Peacock Engineering, Calif.
Pesco Products, Ohio
Purolator Products, New Jersey
Revere Corp. of America, Conn.
Servomechanisms, Inc., Calif.
Stewart Warner, Indiana
Swedlow, Calif.
Texas Bronze, Texas
Weather Head Co., Ohio
Westinghouse, Ohio
Wyman Gordon, Mass.


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SUMMARY

THE N-156 MEETS ALL REQUIREMENTS OF THE OPTIMUM LIMITED WAR AIRCRAFT

Combat Versatility
Force Mobility
Short, Unimproved Field Operability
Fast Turnaround
Platform Stability for Armament Delivery and Reconnaissance
Low Maintenance and Logistics Requirements
Supersonic Performance
Twin Engine Safety
Low Procurement and Operating Costs

THE N-156 HAS COMPLETED ITS FUNDED DEPARTMENT OF DEFENSE DEVELOPMENT PROGRAM

Developed in Parallel with the USAF T-38A
Flight Tested at Edwards Air Force Base
Ready for Immediate Production
Production Delivery 14 Months from Go-Ahead

THE N-156 IS AVAILABLE AT A LOW, *FIXED* PRICE

NORTHROP CORPORATION | NORAIR DIVISION HAWTHORNE, CALIFORNIA