

B-153545

6-20-67

REPORT TO
PERMANENT SUBCOMMITTEE ON INVESTIGATIONS
COMMITTEE ON GOVERNMENT OPERATIONS

SUMMARY OF INFORMATION DEVELOPED

ON THE

NAVY'S F-111B AIRCRAFT

DEPARTMENT OF DEFENSE

This material contains information affecting the national defense of the United States within the meaning of the espionage laws, Title 18, U.S.C., Secs. 793 and 794, as respectively amended, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

Office of the Secretary of Defense
Chief, RDD, ESD, WHS
Date: 09 MAR 2016 Authority: EO 13526
Declassify: X Deny in Full: _____
Declassify in Part: _____
Reason: _____
MDR: 14 -M- 4843



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BY
THE COMPTROLLER GENERAL
OF THE UNITED STATES

JUNE 1967

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14-M-4843

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BY
THE COMPTROLLER GENERAL
OF THE UNITED STATES

JUNE 1967



(UNCLASSIFIED IF DETACHED FROM REPORT)
COMPTROLLER GENERAL OF THE UNITED STATES

WASHINGTON D.C. 20549

B-153545

JUN 20 1967

Dear Mr. Chairman:

In accordance with the request contained in your letter of August 15, 1966, we have examined into (1) the extent to which the F-111 aircraft prime contractor has met performance specifications for the Navy's F-111B aircraft, (2) the production schedule for the Navy's 24 production F-111B aircraft and the model of the TF-30 engine to be used, and (3) whether additional requirements have been placed on Grumman Aircraft Engineering Corporation over its original role of assembling and testing only the Navy aircraft. Information was also obtained on other matters concerning the Navy's F-111B aircraft in which members of your Subcommittee staff indicated an interest during the course of our examination.

A classified summary of the information we developed is enclosed. Formal comments on our findings have not been requested from the Department of Defense. Also, we have not requested the Department of Defense to review the summary for security classification purposes and we plan to make no further distribution of this summary.

This summary completes our submission of information you requested us to develop in your letter of August 15, 1966. We are continuing our examination of the F-111 aircraft program as discussed with you on May 26, 1967, and we will keep you apprised of our findings.

Sincerely yours,

Comptroller General
of the United States

Enclosure

The Honorable John L. McClellan, Chairman
Permanent Subcommittee on Investigations
Committee on Government Operations
United States Senate

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SUMMARY OF INFORMATION DEVELOPED

ON THE

NAVY'S F-111B AIRCRAFT

DEPARTMENT OF DEFENSE

BACKGROUND

Meetings were held during April and June 1961 between officials of General Dynamics Corporation and Grumman Aircraft Engineering Corporation concerning Grumman's participation in the pending F-111 aircraft program as a major subcontractor. As a result of the meetings, agreement was reached between the two companies to initiate a concentrated joint effort in the competition for the F-111 aircraft contract. (UNCLASSIFIED)

Shortly after receipt of the Government's formal request for proposal in October 1961, the two companies reached further agreement that General Dynamics would be fully responsible to the Government for all elements of the program and Grumman would be responsible to General Dynamics for satisfactory performance of the Navy's peculiar subsystems designed, procured, installed, and tested by Grumman and for the structural integrity of all structures designed and fabricated by Grumman. Grumman would be a first-tier subcontractor to General Dynamics and would receive fixed-price incentive contracts with incentive arrangements no less favorable than the Government's contract with General Dynamics. (UNCLASSIFIED)

Grumman was awarded letter subcontract 100 by General Dynamics on February 5, 1962, for its initial participation in the F-111 aircraft program. In September 1962 General Dynamics and Grumman reached agreement on the price for Grumman's participation in the development phase of the program that was to be included in the (UNCLASSIFIED)

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proposal to the Government. This price, which amounted to \$85 million, had been negotiated on the basis of the award of a fixed-price incentive-type subcontract. The agreed price and terms were based on Grumman's tasks as established at that time and were predicated on the general configuration and requirements of the F-111 aircraft as they were envisioned in September 1962.

After General Dynamics was awarded its letter contract for the research and development of the F-111 program by the Air Force, Grumman was extended authorization to proceed with its work on November 26, 1962. Amendment 7 to Grumman's letter subcontract, issued on March 4, 1963, formally identified Grumman's responsibilities under the program. Lengthy negotiations ensued between the two companies, and a chronology of these negotiations, as contained in General Dynamics' request for Air Force approval of its definitive subcontract with Grumman, follows.

Prior to the issuance of this amendment, tasks were both added and deleted from those contemplated in the earlier \$85 million Grumman price agreement. Many of the changes were transfers of tasks between General Dynamics and Grumman, while others were generated by Government-directed changes, design refinements, deleted requirements, etc.

In response to a General Dynamics request, Grumman submitted a complete proposal in September 1963 for all tasks authorized as of that time and, in addition, certain tasks that were expected to be authorized. This proposal included the Grumman-proposed credits for the work deleted and additions to the \$85 million price for added task changes, and it resulted in a target price of just over \$130 million. From receipt of this proposal through July 1964, General Dynamics spent many months reviewing Grumman's proposed costs for the added and deleted tasks.

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In August 1964 General Dynamics and Grumman, by mutual agreement, established a "price configuration." The price configuration identified which of the many tasks authorized would be included in the basic definitive contract negotiations and which tasks would be deferred for subsequent negotiations. The basic criteria for establishing this price configuration were based on the firmness of the tasks. For example, items that had recently been authorized by General Dynamics but not definitized taskwise to the extent that reliable cost estimating could be accomplished were deferred.

Grumman's total target price for the items included in this price configuration was slightly over \$104 million. Using the data obtained during the previous months of analyzing Grumman's cost proposal, General Dynamics prepared its counteroffer.

The initial counteroffer by General Dynamics was presented to Grumman on September 9, 1964, at a total target price of about \$72.6 million. Grumman immediately rejected the offer and stated that acceptance of the offer would put it in a significant over-ceiling position.

Meetings held between officials of the two companies on October 1 and 7, 1964, resulted in Grumman's revised offer of a target price of about \$94.7 million. In further discussion of Grumman's tasks concerning the PHOENIX missile system which was included in the price configuration, agreement was reached to defer negotiations concerning this task. Grumman's proposal, adjusted by deleting the proposed price for the PHOENIX task, was about \$89 million.

During the meeting of October 7, 1964, General Dynamics advised Grumman of its desire to include a price for the authorized super weight improvement program (SWIP) changes within the initial

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total price of Grumman's subcontract. Grumman submitted a firm proposal for the SWIP changes for a total target price of \$8.9 million.

Grumman's proposal included a SWIP change, priced at \$1.5 million, for deletion of saddle tank (additional fuel tanks) provisions from the Navy aircraft. Upon learning of the dollar impact of effecting this change, General Dynamics directed Grumman not to make the change and to exclude the cost from its proposal. The Grumman proposal for SWIP was reduced to \$7.4 million and its proposal was adjusted to a total target price of about \$96.7 million.

~~General Dynamics submitted a counterproposal for a total target price of about \$81.4 million, which was immediately rejected by Grumman.~~ Because of the inability of the two companies to reach a settlement, it was agreed that a five-man team from General Dynamics would perform an on-site analysis of the Grumman proposal. This team performed its review between October 14 and 23, 1964, and included an analysis of Grumman's costs incurred for the items under negotiation and the estimated costs to complete the work.

A meeting between officials of the two companies was held on November 9, 1964, at which time the findings of the General Dynamics team were made known to Grumman and negotiations of the cost areas questioned by the team were conducted. At the conclusion of this meeting, Grumman offered to reduce its previous proposal by \$1.3 million for a total target price of about \$95.4 million. General Dynamics refused to accept this proposal on the basis that Grumman did not give proper credence to the findings and arguments of the General Dynamics five-man team; negotiations were terminated.

Officials of the two companies met again on December 16, 1964, and negotiations during this meeting resulted in a final settlement.

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A total target price of \$87.2 million was negotiated for the tasks agreed to in the adjusted price configuration.

A unique condition to this settlement was the agreement of the two companies to the inclusion of the following clause in the definitive purchase order:

"In the negotiations to establish the initial target cost of this purchase order the parties were unable to agree on said target cost for the work covered by such negotiation. Therefore, in order to resolve this matter, Seller [Grumman] accepted an initial ceiling price of \$4,500,000.00 less than the minimum it desired as a ceiling price for such work, and Buyer [General Dynamics] agrees that, notwithstanding the provisions of clause B.20 of this purchase order, entitled "Incentive Price Revision", the ceiling price of this purchase order shall be increased to the extent of costs incurred by Seller over and above the ceiling price up to an additional \$4,500,000.00, if Seller's share of the work under the fiscal year 1965 and 1966 F-111 production contract, as contemplated by Buyer's Letter No. 189-2-2373, dated 9 October 1964, is fundamentally reduced or eliminated; provided, however, that Buyer shall have no obligation to increase the ceiling price if (i) such reduction or elimination is the result of Seller acts or omissions giving rise to default action by Buyer under the default provisions of this purchase order or any subsequent production contract, or (ii) the Government makes reductions in the first F-111 production contract, and such reductions are shared proportionately by the parties hereto. It is further agreed that any increase in the ceiling price which Buyer may be obligated to make under this clause shall be reduced to the extent that Seller earns profits under any production subcontract issued by Buyer under the F-111 Program."

Grumman, in accepting a settlement some \$8 million less than its latest revised proposal, agreed to the price only on condition that a price ceiling greater than the normal 120 percent of cost be included as part of the terms. In order to secure Grumman's

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agreement to the \$87.2 million price, General Dynamics agreed to a 125-percent ceiling. The ultimate ceiling price was agreed to at \$100.5 million.

Subsequent to the settlement of the basic price, miscellaneous adjustments were made to the negotiated price, resulting in the following negotiated price/cost elements:

Total target cost	\$79,230,075
Total target profit	<u>7,130,700</u>
Total target price	<u>\$86,360,775</u>
Total ceiling price	<u>\$99,532,782</u>

In addition to the above, a firm fixed price of \$829,557 was negotiated for a wind-tunnel testing program and other engineering services.

At December 31, 1956, the total target price, through change order 81 dated December 1, 1966, amounted to \$131,139,541. Actual costs incurred through December 31, 1966, totaled \$134,682,424 for the incentive portion of the subcontract and \$326,749 for the fixed-price portion.

As directed by the Naval Air Systems Command, Program Evaluation and Review Technique reports containing total estimated completion costs were not made available to us until after the reports for the following quarter had been issued. The latest report made available to us was for the quarter ending September 30, 1966. It showed that the estimated cost to complete the incentive portion amounted to about \$148 million. This estimated cost included cost estimates for tasks that had not been negotiated, and the ultimate cost may likely vary.

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Grumman was awarded follow-on, fixed-price, incentive subcontract 200 on June 15, 1965, to deliver four F-111B aircraft, certain components for 65 Air Force F-111A aircraft, and aerospace ground equipment, as well as to provide other services. A target price of \$90,280,996, consisting of a target cost of \$82,826,601 and a target profit of \$7,454,395, or 9 percent of target cost, was negotiated with an 80/20 cost-sharing arrangement and a ceiling price of \$103,533,251.

The subcontract provided General Dynamics with an option to procure quantities of items for 132 Air Force F-111A aircraft in fiscal year 1967 and quantities of items for an additional 210 F-111A and 20 F-111B aircraft in fiscal year 1968, which would increase the contract target price to \$259,950,334. This option was subsequently exercised by General Dynamics. The increased target price consisted of a target cost of \$233,486,545; a target profit of \$21,463,789, or 9 percent of the target cost; an 80/20 cost-sharing arrangement; and a ceiling price of \$298,108,182.

As of December 31, 1966, the target price through change order 27 dated September 27, 1966, had increased to \$321,050,118. This price consisted of a target cost of \$292,619,433 and a target profit of \$28,430,685. Costs recorded at December 31, 1966, amounted to \$45,721,759. We were advised by Grumman officials that Program Evaluation and Review Technique reports had not been submitted as of February 3, 1967, and estimated costs to complete could not be obtained.

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DELIVERY AND CONFIGURATION OF
NAVY F-111B AIRCRAFT

The scheduled and actual delivery dates of the five Navy re-
search and development F-111B aircraft were as follows:

<u>Aircraft</u>	<u>Schedule as of March 4, 1963</u>	<u>Schedule as of August 12, 1964 (note a)</u>	<u>Actual delivery dates</u>
1	May 1965	May 1965	May 1965
2	July 1965	Oct. 1965	Oct. 1965
3	Sept. 1965	Dec. 1965	Dec. 1965
4 ^b	Nov. 1965	May 1966	July 1966
5	Dec. 1965	July 1966	Sept. 1966

^aIncorporated into basic purchase order 100.

^bNavy F-111B aircraft number 4 crashed at Calverton, Long Island,
New York, on April 21, 1967.

An examination of the Navy's delivery and acceptance documents showed that its five aircraft were accepted with 2,390 specification deviations and exclusions. An official of the Naval Plant Representative Office at Grumman advised us that it was not unusual under a research and development program such as the F-111 to provisionally accept an aircraft incorporating less than the total specified requirements. He also stated that the test program would have been delayed had the aircraft not been accepted with deviations and exclusions.

The records we examined showed that a great deal of emphasis was placed on meeting the delivery and first flight schedule of the Navy's first F-111B aircraft. The F-111 System Program Office in an August 1964 message stated in part that:

"The realigned F-111B RDT&E [Research, Development, Test and Evaluation] aircraft delivery and test schedules will be implemented by the SPO [F-111 System Program Office] with the understanding that the conditions outlined in the memorandum for Secretary of the Air Force from Secretary of the Navy DTD 31 Jul 64 will be met. The SPO understands these conditions to be as follows:

(A) schedule for first flight will be maintained ***.'

In a memorandum of June 25, 1964, as subsequently revised, General Dynamics' F-111 engineering supervisors were advised that the effective points in the program for incorporating super weight improvement program configuration changes had been established in order to accomplish the following objectives: (UNCLASSIFIED)

- "(A) No change in operational dates.
- (B) Minimum change to airplane delivery and schedule.
- (C) Meet all RDT&E Program objectives with minimum impact on program cost and schedule." (UNCLASSIFIED)

This memorandum describes the salient features of SWIP configuration changes and describes the configuration of Navy F-111B aircraft number 1 as follows: (UNCLASSIFIED)

"The Navy #1 airplane will be manufactured from the #4 airframe and embody the production configuration of the forward Navy Avionics bay ***, will incorporate the Navy fuel system configuration by modification of the TAC [Air Force] airframe, the PMS [Phoenix Missile System] and ECM [Electronic Countermeasures] installation provisions will not be incorporated ***." (UNCLASSIFIED)

Grumman submitted engineering change proposals for revised configurations for the Navy's first three F-111B aircraft on July 29, 1964, and February 23, 1965, respectively. After reviewing these proposals, the Naval Plant Representative, in a letter dated March 9, 1965, to the Air Force Plant Representative at General Dynamics, concerning the change of July 29, 1964, stated in part that: (UNCLASSIFIED)

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"Navy version of many components not available in time to meet schedules for delivery and first flight of N1 [Navy F-111B aircraft number 1] *** it appears this configuration represents a deviation to the contract specifications. Approval recommended if it is desired to maintain existing flight test and acceptance schedule."

Also, in a letter dated July 20, 1965, the Naval Plant Representative at Grumman advised the Air Force Plant Representative at General Dynamics that the engineering change proposal of February 23, 1965:

"*** incorporates TAC Landing Gear on Navy aircraft 1, 2 and 3. The important significance of this change is that the subject aircraft are no longer carrier suitable in this configuration. In accepting this change, consideration should be given to a monetary withholding due to the lack of capability of the aircraft ***. Disapproval of this ECP [Engineering Change Proposal] is recommended."

This recommendation was not adopted, as the change proposals were incorporated into the Grumman purchase order by change order 21 dated September 15, 1965, and change order 33 dated December 7, 1965.

A General Dynamics official informed us that the airframe intended for Air Force F-111A aircraft number 4 was used for the first Navy F-111B aircraft because engineering work on the fuselage of the Navy version had not progressed to the point where it could be completed in time to meet the delivery schedule. According to information furnished by Grumman's F-111 Program Manager, the Air Force landing gears were used because the design of common landing gears--one of the super weight improvement program changes--had not been completed in time for incorporation of the common gear on the initial F-111B aircraft.

PERFORMANCE OF NAVY'S
F-111B AIRCRAFT

The Chief of Naval Operations, in May 1962, issued Specific Operational Requirement W16-07 which established a requirement for an all-weather, carrier-based aircraft weapon system for the purpose of gaining and maintaining air superiority in fleet operating areas and in Navy and Marine objective areas. This requirement also established a secondary capability for the weapon system to perform air-to-ground missions in support of amphibious warfare.

The Navy's version of the F-111 aircraft was designed to meet the above requirements. The aircraft's primary armament is the PHOENIX missile system which is being developed by the Hughes Aircraft Company. (UNCLASSIFIED)

In our examination of the performance characteristics of the Navy's F-111B aircraft, we were not granted access to individual aircraft flight-test reports. We did, however, have access to the Navy's Technical Development Plan and Project Master Plan for the F-111B aircraft program, which included information on the F-111B's performance. (UNCLASSIFIED)

The Technical Development Plan, which is prepared annually for budgetary purposes, also serves as a basic decision-making document at top level management echelons and is kept up-to-date as far as significant program changes are concerned. The Project Master Plan contains information based on data contained in the current Technical Development Plan and the System Package Program document which is prepared by the Air Force F-111 System Program Office.

(UNCLASSIFIED)

The Navy's Technical Development Plan WF16-07, dated April 1, 1966, contained the Navy's performance estimates which the F-111B aircraft is expected to achieve by December 1969--the scheduled commencement date of the Navy's Board of Inspection and Survey evaluations. These performance estimates showed that the Navy does not expect the aircraft to meet its specification requirements in the areas of loiter, altitude, combat ceiling, supersonic performance, wind over the deck, time on station, maneuverability, weight, and single-engine rate of climb. [REDACTED]

This document also showed a comparison of the performance and design characteristics between the F-111B aircraft specifications and those established in the Navy's Specific Operational Requirement (SOR) as follows: (UNCLASSIFIED)

"(1) Combat Ceiling. SOR requires 60,000 ft. Specifications require 55,000 ft. Limiting factors are weight and drag of the aircraft and engine capabilities. [REDACTED]

(2) Carrier operations - SOR requires system to be capable of operating from CVA-43 and larger carriers and must be able to land aboard with its primary armament or equivalent. The specification requires that the airplane be capable of full operation from Class CVA-59 and subsequent carriers. Limited capability shall exist from CVA-41 Class carriers. [REDACTED]

(3) Length - SOR requires not over 56 feet with minimum folding and desirably 56 feet without folding. Specification requires overall length of 66 feet 8.7 inches and folded length of 61 feet 8.4 inches. Joint AF/Navy requirements do not permit the smaller size aircraft. [REDACTED]

(4) Gross T/O weight - SOR requires not over 55,000# with full internal fuel and 6,000# of ordnance and desires 50,000# maximum gross T/O weight. Specification requires that the basic design mission combat weight not exceed [REDACTED]

62,788#'s. However, the Navy's projection of growth is estimated at 78,038 lbs. for the gross T/O weight. It is recognized that this weight exceeds the SOR by 23,038 lbs. and every effort is being expended to reduce the weight without unduly sacrificing commonality and mission capability. The Super Weight Improvement Program (SWIP) for this aircraft has succeeded in reducing weight to some degree. However, as in all past aircraft developments, there is a tendency for an aircraft under development to grow. It is safe to report, however, that it is not probable that the SOR or specification weight will be achieved. The principal reasons for the weight problem are: (1) adherence to commonality, (2) penalties for the F-111B resulting from F-111A mission requirements, (3) contractor's late initiation of effective weight control procedures, and (4) changes in requirements. SWIP has been utilized to reduce the weight in areas of concern. SWIP will continue through development." [REDACTED]

* * * * *

"(9) Fleet Introduction - SOR requires that the aircraft be available for OPEVAL [Operational Evaluation Tests] by 1967 and for fleet introduction by 1968. Present plans are to commence OPEVAL and introduce to the fleet in 1970. The delay in meeting the SOR dates results from delay in initiating development of the two service effort, SWIP and development problems in the aircraft engine and AMCS [Airborne Missile Control System] programs." [REDACTED]

The Navy's Project Master Plan WF16-07 of February 1, 1966, showed a comparison of certain aspects of the F-111B aircraft performance between (1) the F-111B aircraft specification, (2) performance estimates for F-111B aircraft number 5 which incorporates all super weight improvement changes, and (3) the Navy's performance projections for F-111B aircraft number 6--the first production aircraft to be equipped with the higher thrust TF-30 P-12 engine. A schedule of the information related to the above performance requirements follows: [REDACTED]

	<u>Aircraft specification</u>	<u>Estimate for F-111B number 5 (note a)</u>	<u>Navy projection for F-111B number 6 (note b)</u>
Engine	TF-30 P-1	TF-30 P-1A	TF-30 P-12
Fuel capacity	22,847 lbs.	23,553 lbs.	23,553 lbs.
Windshield angle	21°	21°	30°
Weight empty	38,804 lbs.	43,350 lbs.	46,000 lbs.
Weight gross	62,788 lbs.	74,769 lbs.	78,038 lbs.
Fuel-design mission	16,120 lbs.	23,553 lbs.	23,553 lbs.
Wind-over-deck with C-7 catapult--hot day	-8 knots	+15 knots	+19 knots
Landing weight	50,068 lbs.	55,066 lbs.	58,335 lbs.
Wind-over-deck with Mk 7-2 arresting gear--hot day	+5 knots	+15 knots	+22 knots
Single engine rate of climb--military thrust	595 ft./min.	267 ft./min.	315 ft./min.

^aWeight estimated by the prime contractor; performance factors estimated by the Navy. (UNCLASSIFIED)

^bAll factors are Navy estimates. (UNCLASSIFIED)

The Project Master Plan dated February 1, 1967, shows a further comparison between the performance requirements contained in the aircraft specifications and the performance expected after incorporating certain modifications, referred to by the Navy as a carrier-suitability package, on subsequent production F-111B aircraft. Significant factors compared follow.

	<u>Aircraft specifications</u>	<u>Navy estimate for modified F-111B aircraft</u>
Speed (structural maximum speed)	2.5 Mach.	2.5 Mach.
Combat ceiling	55,000 ft.	47,505 ft.
Weight-design mission	62,788 lbs.	77,806 lbs.
Combat air patrol station time-- no combat	4.0 hrs.	3.5 hrs.
Combat air patrol station alti- tude	35,000 ft.	30,000 ft.
Fuel-design mission	16,120 lbs.	25,502 lbs.
Level accelerated time loiter mach. 2.0	5.5 mins.	5.5 mins.
Single engine waveoff rate of climb (90°F.--day)	595 ft./min.	322 ft./min. ([REDACTED])

We have been informed by a Navy official that the estimates shown in the above schedule will pertain to the first Navy F-111B aircraft that will be equipped with both the P-12 engine and the proposed carrier-suitability package. The carrier-suitability package consists of changes made to the aircraft, such as (1) extending the nose of the aircraft 24 inches and moving the main landing gear aft 8 inches to achieve better balance and added fuel capacity, (2) modifying the escape capsule to improve pilot visibility, (3) incorporating high-lift devices, and (4) redesigning the engine nozzles to reduce drag. We were informed also that the performance data contained in the above schedules were accurate and current as of May 31, 1967. [REDACTED]

GRUMMAN'S ROLE IN THE
F-111 AIRCRAFT PROGRAM

Grumman was given a major role in the research and development phase of the F-111 aircraft program as a subcontractor to General Dynamics. Generally, its responsibility included the design, development, tooling, manufacture, testing, and integration of certain aircraft components for 18 Air Force F-111A and five Navy F-111B aircraft, as well as test equipment, aerospace ground equipment, and spare parts for support of these aircraft. Grumman was given the responsibility to assemble and test the Navy's F-111B aircraft. (UNCLASSIFIED)

Our examination showed that Grumman's original role in the F-111 aircraft program had not been materially changed. (UNCLASSIFIED)

PRODUCTION SCHEDULE OF THE
NAVY'S F-111B AIRCRAFT

As indicated in an F-111 aircraft delivery schedule dated July 28, 1966, the Navy's 24 F-111B production aircraft are scheduled for delivery as follows:

<u>1968</u>	<u>Quantity</u>
May	1
July	1
September	1
November	1
<u>1969</u>	
January	1
February	1
March	1
April	1
May	1
June	1
July	1
August	2
September	2
October	3
November	3
December	3
	<u>24</u>

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On July 27, 1965, the System Program Office advised General Dynamics that the Bureau of Naval Weapons had redesignated the first four production F-111B aircraft as preproduction F-111Bs to be assigned to research and development flight testing, in order that a more realistic Board of Inspection and Survey date might be met. Three of these aircraft were expected to be assigned to Grumman and the fourth one was to go to Hughes Aircraft Company for PHOENIX missile system installations and Navy technical evaluation.

The plan is that the P-12 model of the TF-30 engine currently under development by Pratt and Whitney will be used in all 24 production F-111B aircraft.

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