NAVSTAR

GLOBAL POSITIONING SYSTEM

PROGRAM MANAGEMENT PLAN

15 JULY 1974

SAMSO/YE
HQ SPACE & MISSILE SYSTEMS ORG (AFSC)
LOS ANGELES AIR FORCE STATION
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REPLY TO ATTN OF: YE

20 SEP 1974

SUBJECT: Program Management Plan (PMP)

TO: Mr. R. Easton, Naval Research Lab/Code 7960, WASH, D.C. 20375

1. The attached Program Management Plan for the NAVSTAR, Global Positioning System (GPS) is provided to you for use during the definition, design, development, testing, acquisition, and operation of the GPS. This document is the Joint Program Office (JPO) operating plan for system management throughout the life cycle of the program beginning with Phase I, Concept Validation. As the program progresses, the PMP will be updated to reflect current status and progress and to incorporate recommended changes approved by the Joint Program Manager.

2. For further information you may contact Maj H. S. Hughes, SAMSO/YEC (Ext. 32737).

Bradford W. Parkinson

BRADFORD W. PARKINSON, Colonel, USAF
Deputy for Space Navigation Systems

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Approved by Bradford W. Parkinson
BRADFORD W PARKINSON, Col, USAF
Program Manager, NAVSTAR Global
Positioning System

FORWORD

This Program Management Plan (PMP) establishes Joint Service Program Office (JPO) executive policies and implementing procedures for the management and acquisition of the NAVSTAR, Global Positioning System (GPS). It provides Executive Service guidance for all Services/Agencies engaged in the definition, design, development, testing, acquisition, and operation of the GPS and further implements the single manager principles of DOD Directive 5000.1.

This document will be the operating plan for system management and acquisition throughout the life cycle of the program beginning with Phase I, Concept Validation. As the program progresses, this document will be annually updated to reflect current status and progress. A formal revision cycle will automatically be initiated by the JPO upon publication of a new Program Management Directive.

The PMP and subsequent revisions shall not be used either by the Government or Contractors as a specification document. Specifications and requirements may be repeated herein, but only as a convenience to implementing and supporting agencies.

TABLE OF CONTENTS

NOTE: The Intelligence Section (Secret) covering GPS Survivability/Vulnerability and Threat Analysis is available upon request from the JPO. It is omitted from this PMP in order to keep this document unclassified.

SECTION I

PROGRAM SUMMARY AND AUTHORIZATION

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1.1 BACKGROUND

Since the early 60's, both the Navy and the Air Force have actively pursued the idea that navigation and positioning could be performed using radio signals transmitted from space vehicles. The impetus for such a space-based system was the potential for a universal positioning and navigation system which could meet the needs of a broad spectrum of users. In addition, definite cost benefits would accrue by reducing the proliferation of specialized equipments responsive only to particular mission requirements.

Each service embarked upon an extensive technology program of studies, experiments, and tests to demonstrate the feasibility of a Defense Navigation Satellite System (DNSS). The Navy sponsored two navigation satellite programs: TRANSIT, now operational, and TIMATION, a technology program to advance the development of high stability oscillators, time transfer, and three dimensional navigation. The Air Force concurrently conducted preliminary concept formulations and system design studies for a highly accurate three dimensional navigation system called System 621B. The System 621B concept and system techniques were verified in a series of tests and experiments at Holloman Air Force Base and the White Sands Missile Range.

A key step in the integration of these activities was the memorandum issued by the Deputy Secretary of Defense on 17 April 1973. The memo designated the Air Force as the Executive Service to coalesce the concepts proposed for a DNSS into a comprehensive and cohesive DOD system. A system concept designated NAVSTAR, Global Positioning System, emerged as the synergistic combination of the best features of the previous navigation satellite concepts and included the Army Pos/Nav requirements.

1.2 PROGRAM AUTHORIZATION

The Development Concept Paper (DCP) #133, 15 April 1974, proposed two alternative programs leading to the acquisition of a Global Positioning System (GPS). The GPS program was briefed to the Defense Systems Acquisition Review Council (DSARC) on 13 December 1973. On 22 December 1973, the Deputy Secretary of Defense, in a memo to the Secretaries of the Military Departments, approved the NAVSTAR, GPS program.

1.3 APPLICABLE DOCUMENTATION

1. Deputy Secretary of Defense Memorandum "Defense Navigation Satellite Development Program", 17 April 1973.

2. Development Concept Paper #133, NAVSTAR, Global Positioning System, 15 April 1974.

3. Deputy Secretary of Defense Memo "NAVSTAR Global Positioning System" 22 December 1973.

4. Program Management Directive No. R-S 4-075-(1) "NAVSTAR Global Positioning System" 2 May 1974:

5. AFSC Form 56 : [illegible]75-1-74-33, 24 June 1974.

6. System Specification for the NAVSTAR Global Positioning System Phase I, Including Appendices I & II. SS-GPS-101B CI-07868, 15 April 1974.

*7. System Segment Specification for the Control System Segment of the NAVSTAR Global Positioning System, Phase I. SS-CS-101A, CI-07868, 15 April 1974.

*8. User System Segment Specification for the NAVSTAR Global Positioning System, Phase I, SS-US-101A, CI-07868, 3 April 1974.

9. System Segment Specification for the Space Vehicle System Segment of the NAVSTAR Global Positioning System, Phase I, SS-SVS-101A, CI-07868, 26 June 1974.

10. Program Test Plan for the NAVSTAR Global Positioning System Phase I, Annex I, Integrated Logistics Support Plan. YEN-74-102A, CI-07868, 15 April 1974.

*11. Specification for the NAVSTAR Global Positioning System Inverted Range. STE-IR-101A, CI-07868, 15 April 1974.

12. Joint Service Global Positioning System Integrated Logistics Support Plan for User Equipment, 15 April 1974.

*13. Specification for the NAVSTAR Global Positioning System Test Pod, STE-TP-101A, CI-07868, 15 April 1974.

14. "User Equipment Design to Cost/Life Cycle-Cost Program," YEN-74-105, 5 April 1974.

*These documents will be re-published on 30 September 1974.

1.4 IMPORTANCE CATEGORY

The GPS Importance Category is 2 (IC-2).

1.5 NAVSTAR SYSTEM DESCRIPTION

The Global Positioning System (GPS) is a space-based radio positioning and navigation system that will provide extremely accurate three-dimensional position and velocity information and system time to suitably equipped users anywhere on or near the earth. The GPS consists of three major segments: Space System Segment; Control System Segment; and User System Segment.

1.5.1 Space System Segment: The operational GPS will deploy three planes of satellites in circular, 10,000 nautical mile orbits, with an inclination of 63°. Each plane would contain eight satellites. This deployment will provide the satellite coverage for continuous, three dimensional positioning and navigation. Each satellite will transmit a composite signal at two L-band frequencies consisting of a protected navigation signal and a clear navigation signal. The signals contain navigation data such as satellite ephemeris, atmospheric propagation correction data, and satellite clock bias information which is provided by the master control station. The second L-band navigation signal will permit the user to determine the ionospheric group delay or other Electro Magnetic disturbances in the atmosphere.

1.5.2 User System Segment: Using the navigation signal from each of four satellites, the user receiver measures four independent pseudo-ranges and pseudo-range rates to the satellites. The user receiver/processor will