

Position Classification Standard for Air Navigation Series, GS-2183

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SERIES DEFINITION

This series includes positions responsible for assisting the pilot in aircraft operations by determining, planning, and performing the navigational aspects of the flight. Positions in this series require knowledge of the various methods of air navigation, and skill in using navigational instruments, equipment, and systems in conjunction with flight instruments to direct the movement and positioning of the aircraft to accomplish a specific mission or assignment. Some positions may require knowledge of the use and deployment of fighter aircraft ordnance; skill to conduct preflight checks, recognize malfunctions, and coordinate delivery with the pilot; and knowledge of weapon ballistics and skill to operate related avionics systems for fighter aircraft. Also included are positions responsible for providing ground and flight instruction in air navigation.

This standard supersedes the classification criteria for navigator positions contained in the standard for the Aircraft Operation Series, GS-2181, issued December 1967 (TS-71) and revised May 1979 (TS-35).

SERIES COVERAGE

This series primarily covers civilian technician positions in armed forces reserve organizations. In addition to being members of the reserves, employees in this series occupy full-time civilian positions in their particular unit. Positions specifically covered by this series include (1) navigators for heavy multiengine transport or tanker aircraft and (2) weapon systems specialists in fighter or reconnaissance aircraft. The positions covered require application of basic air navigation knowledge and skills and, in addition, the knowledge and skills associated with the particular aircraft and missions assigned to the unit.

Some positions covered by this series serve as flight crew members in support of unit flying assignments. Other positions have the additional responsibility for providing ground and flight instruction in the procedures and techniques for navigating the aircraft. Instructor positions are covered since their career relationships are in the aircraft operation field, and the positions have as their paramount requirement experience and training in air navigation.

There may be other positions not described above which require air navigation knowledge and skills. Such positions may be classified in this series when no other series is more appropriate.

EXCLUSIONS

1. Positions which primarily involve piloting of fixed or rotary wing aircraft, or performing related staff work which requires primarily the application of pilot knowledge and skills, are classified in the [Aircraft Operation Series, GS-2181](#).

2. Positions of flight crew members, such as flight engineer, aerial refueling technician, and aircraft loadmaster, are classified in the [Aircrew Technician Series, GS-2185](#).
3. Positions concerned with the collection, evaluation, and preparation of aeronautical information for dissemination in publications concerning safe navigation and related operations are classified in the [Navigational Information Series, GS-1361](#).
4. Positions which involve primarily the maintenance or repair of aircraft components, such as navigational systems, and which have as their paramount requirement the application of knowledge and skills gained through trade or craft experience, are graded under the Federal Wage System.
5. Positions which require primarily a professional knowledge of education and training, or a practical knowledge of the principles and techniques of education and training in combination with a knowledge of the subject, occupation, or field in which education, instruction, and training are given, are classified in an appropriate series in the [Education Group, GS-1700](#), when they have their career relationships in the education and training field.

TITLES

Authorized titles for positions primarily concerned with the performance of flight crew navigational duties are:

Navigator

Weapon Systems Specialist

For positions primarily concerned with providing ground and flight instructions and evaluations, the parenthetical (Instructor) suffix is added.

Other specialized positions in the Air Reserve Technician program appropriately classified to this series may have other titles as indicated in FPM Supplement (Internal) 930-71, *Recruitment of Air Reserve Technicians Through Competitive Examination*.

For positions that meet the criteria for titling in the [General Schedule Supervisory Guide](#), *Supervisory* is prefixed to the basic position title.

OCCUPATIONAL INFORMATION

Air Navigation

Strictly defined, air navigation is the process of determining the geographical position, and maintaining the desired direction, of an aircraft relative to the surface of the earth. Navigation information, which is the work product of positions in this occupation, is expressed in terms of position, direction, distance, and time. These are the four basic reference points used by navigators to direct the movement of the aircraft over long distances or to position it at a particular location and time to perform a specific assignment.

The "science" or "art" of navigation is common to both aviation and marine operations. Many of the methods, instruments, and equipment used are identical. However, certain unique conditions are encountered in air navigation that have a special impact on the work of the navigator. These include: the great speed involved, limited endurance (i.e., fuel constraints), need for continued motion once airborne, and the direct impact of weather on the aircraft. These conditions, in turn, impose special knowledge and skills requirements for the air navigator.

Military Setting

The military environment adds yet another dimension to the work of some positions in this series because of the unique requirements of certain military missions or assignments. For example, certain training assignments involve navigation without the use of conventional radio navigational aids (since these would not be available in combat situations) to perform tactical airdrops of personnel or supplies. Such assignments have no direct counterpart in the general field of navigation, and require detailed preflight planning and selection of navigation methods that can be accomplished quickly and accurately during flight.

Two basic types of positions are covered under this series. The first type are the navigators for heavy multiengine aircraft where the missions include cargo or personnel airlift, airdrop of supplies and personnel, search and rescue, and in-flight refueling. The second category includes positions, designated as weapon systems specialists, assigned to certain fighter and reconnaissance aircraft. Both types of positions have in common the responsibility for assisting the pilot in flying a preplanned route to a specific destination or rendezvous point, or to position the aircraft at some predetermined point and time to accomplish a specific mission.

Navigator

For navigators, major crew tasks and responsibilities include:

- Generating mission planning data, including: analyzing and determining fuel requirements; selecting the most advantageous route, when not otherwise preplanned or dictated by operational requirements; plotting the route of flight and preparing navigational charts taking into account airspeed, distance, method of navigation, altitudes

used, weather conditions, and terrain; constructing the navigation portion of the mission briefing of crew members; and coordinating with the pilot on preparation of the flight plan.

- Performing preflight check of navigational equipment and systems;
- Monitoring adherence to air traffic clearances and standard departure procedures during takeoff and climb phases;
- Maintaining the flight log, computing expected time of arrival at destination or rendezvous point, and advising the pilot of progress;
- Monitoring fuel consumption in flight;
- Preparing, on over-water missions, the airborne report of aircraft position and in-flight weather conditions;
- Assisting the pilot during low-level flight in seeing and avoiding obstacles and locating navigation references both with and without the use of night vision devices;
- Establishing, for search and rescue missions, search pattern (e.g., creeping line) computing headings, times, and turns required;
- Computing, for aerial delivery missions, the proper positioning of the aircraft to drop cargo or personnel, considering conditions at the drop zone and parachute ballistics determine release point;
- Navigating tanker aircraft for rendezvous with receiver aircraft over the refueling point and providing control and separation of tanker and multiple receiver aircraft; and
- Monitoring altitude and position of the aircraft during descent, using radar and approved approach procedures, and, in emergencies, computing approach data for the pilot.

Weapon Systems Specialist

Weapon systems specialists perform pre-mission planning tasks that are similar to those of the navigator in that they involve many of the same techniques and procedures as well as the use of similar data for the solution of navigational problems. Due to the nature of the mission, however, certain duties are unique to the weapon systems position. Tasks and responsibilities include:

- Performing preflight check of aircraft ordnance;
- Computing film requirements and operating sensor systems for photo-reconnaissance missions;

- Assisting the pilot in preflight check and inspection of the aircraft;
- Operating aircraft equipment (e.g., radios, navigational equipment) to assist the pilot in air and ground operation;
- Monitoring the aircraft's altitude, airspeed, fuel consumption, and weapon status during all phases of a mission;
- Maintaining visual, night vision device, and radar area surveillance, advising the pilot of potential threats, or employing electronic countermeasures;
- Operating target acquisition systems and advising pilot of target position;
- Computing bombing data to adjust for altitude, airspeed, wind conditions, and bomb ballistics;
- Coordinating with the pilot on ordnance delivery; and
- Assisting the pilot during aerial refueling operations.

Knowledge and Skills

This section discusses the knowledge and skills required for the basic aircrew positions of navigator and weapon systems specialist. Unless otherwise indicated, the knowledge and skills described are generally applicable to both kinds of positions.

- Knowledge of the various methods of air navigation (dead reckoning, celestial, radio, pressure pattern, grid, or inertial), and skill in applying the appropriate method to the mission involved to generate planning data;
- Knowledge of flight instruments and navigational equipment and their functions and interfaces, and skill to program, operate, and cross-check systems and analyze possible causes of malfunctions or discrepancies;
- Knowledge of instrument flight procedures, air traffic procedures, airway routes and structures, oceanic routes, and use of navigational aids, and skill in using this knowledge to plan routes to be flown and monitor progress of flights;
- Knowledge of the effect of weather/atmospheric conditions on flight operations, and skill in considering these factors in mission planning and in compensating for them during flight;
- Knowledge of techniques and sources of data for fuel planning, and skill to determine fuel requirements, monitor consumption in flight, and analyze performance;

- Knowledge of tactical flight formation and low-level flight procedures, and skill in using station-keeping radar and night vision devices to monitor position and navigate;
- Knowledge of the factors affecting parachute ballistics for missions involving aerial delivery of cargo or personnel, and skill to determine the air release point and coordinate with the pilot during airdrop operations;
- Knowledge of navigational procedures relative to aerial refueling tracks, and skill to position the tankers for rendezvous with receiver aircraft;
- Knowledge of the ordnance for fighter aircraft and its uses and deployment, and skill to conduct preflight checks, recognize malfunctions, and coordinate delivery with the pilot (weapon systems specialist);
- Knowledge of weapon ballistics and skill to operate related avionics systems for fighter aircraft (weapon systems specialist); and
- Knowledge of the function and operation of sensor/photo equipment for photo reconnaissance missions, and skill to employ these systems under exacting conditions.

Instructor Positions

Reserve training programs: Reserve training programs at the unit level provide the specialized training and experience needed to upgrade and maintain full performance level skills of assigned crew members. Those without prior experience or training are required to complete training in active duty or reserve forces military schools, and then receive advanced training in their specialty for the particular aircraft and mission involved. Reservists with previous related experience may be provided refresher training at the unit level, depending on the quality of their prior experience and training. Though all reservists are trained in at least the basics of their specialty, they nonetheless require extensive ground and flight training to master and maintain skills required to perform effectively the full scope of responsibilities.

Instructor assignments: Irrespective of their particular specialty, instructor positions in this series have in common the requirement for: (1) demonstrated mastery of the full performance level knowledge and skills of the specialty; and (2) knowledge of the methods of instruction and skill to apply this knowledge to ground and airborne training of reservists.

Instructors in this series follow prescribed programs of instruction in terms of course content, coverage, and scope of material presented. The instructor may adapt lesson material to meet the needs of particular students and/or supplement existing training materials with approved texts. However, the overall program of instruction is standardized according to the type of aircraft assigned and/or the missions performed by the unit.

Instructors are selected from among the best qualified navigators and weapon systems specialists. Prior to designation as instructors, they are required to undergo formal training in the

methods of instruction, complete on-the-job training including practice instruction, and pass a flight evaluation. Typical duties of instructors include:

- Reviewing prior training and experience records of newly assigned reservists to determine and plan the type and level of training necessary to achieve the required level of proficiency or skill;
- Preparing individual developmental records, along with a training syllabus with projected units of training required;
- Planning and conducting ground training, including simulator and procedures training on operational mission requirements, equipment operation, correct method for performing aircrew specialty duties, and applicable emergency procedures;
- Scheduling and participating in flights with reservists to observe in-flight performance, demonstrate proper procedures and techniques, and evaluate progress;
- Recommending military reclassification actions for reservists;
- Maintaining records of ground and flight training provided to reservists, analyzing progress, and preparing required training reports; and
- Performing various other administrative functions concerned with the unit training program, such as scheduling reservists for training periods; interviewing candidates for navigator positions; acquiring training aids, course materials, and training equipment; and insuring that technical orders/publications are properly maintained and pertinent changes are brought to the attention of the reservists.

Flight examining functions are performed by fully qualified instructors who are authorized to administer flight evaluations for their particular aircrew specialty. Typical flight examining duties include:

- Evaluating the performance of aircrew members completing initial training;
- Instructing, evaluating, and examining rated instructors;
- Providing periodic flight evaluations of rated aircrew members; and
- Administering requalification evaluations.

Flight examining activities may also include the performance of standardization/evaluation duties, which include:

- Insuring that established standards of flight proficiency are maintained through evaluation or observation;

- Evaluating performance during operational and training flights on a no-notice basis;
- Analyzing evaluation data for adverse trends in performance;

- Evaluating ground and flight training programs;

- Recommending improvements in aircrew procedures;

- Attending critiques of flight evaluations; and

- Reviewing aircraft incidents, operational hazards, and accident reports and making appropriate recommendations to the supervisor.

GRADING POSITIONS

The grade level material discusses the work of these positions in terms of:

- Knowledge and skills required;

- Nature and purpose of assignments; and

- Degree of hazard involved.

Also considered in the development of this standard, but not addressed in specific detail, are the factors of supervision received, guidelines, nature and purpose of contracts, and physical demands. These factors are not treated separately in the grade level material, because they either tend to have a constant value, or vary so slightly from one position to another as to have no significant utility in distinguishing among grade levels. For example, the demands placed on these positions for performance either as a flight crew member or as an instructor are such that close supervision is rarely possible or even feasible. This high degree of freedom from supervision has been taken into account in the development of the grade level material. Also, while the specific content of the guidelines used in the work (e.g., the flight manuals and aircrew training manuals) varies among different assignments, the nature and type of guidance provided (in terms of its specificity and applicability to the work) usually varies only slightly.

The following section contains descriptions of representative instructor positions in each of the specializations. These benchmark descriptions are composites of the typical instruction and flight examining duties and responsibilities found in a range of specific assignments.

Grade levels for line flight crew positions of navigator or weapon systems specialist, which do not perform instructor and/or flight examiner functions, should be determined in relation to the benchmark positions. Flight crew positions at the full performance level are classified one grade below that reflected by the benchmarks. Grade levels for trainee or developmental positions at GS-9 or below may be derived by considering the progress of the individuals involved in relation to meeting full performance level requirements. Supervisory positions in this series should be evaluated by reference to the [General Schedule Supervisory Guide](#).

BENCHMARKS

NAVIGATOR (INSTRUCTOR), GS-2183-12, BMK #1

Duties

Positions at this level provide ground and flight instruction to reserve navigators in the proper procedures and techniques for planning and accomplishing unit flying missions for heavy multiengine aircraft, including transport of cargo or personnel, aerial refueling, airdrop of equipment or personnel, or search and rescue flights. In addition, some positions perform flight examining functions as described in the Occupational Information section of the classification standard.

Knowledge and Skills

Knowledge and skills required for performance of the work include:

- Knowledge of the methods of air navigation (e.g., dead reckoning, celestial, or radio) appropriate to the flight training mission, and skill to apply this knowledge in planning and performing the navigation portion of the mission;
- Knowledge of aircraft systems and equipment related to the navigation function, and skill to operate systems, cross-check information, and translate navigational data into useful and reliable information for the pilot;
- Knowledge of basic aerodynamics and the effect of various forces and conditions on flight operations, and skill in considering these factors in planning missions and during flight; and
- Knowledge of methods of instruction and the navigational requirements of assigned missions, and skill in using this knowledge in ground training and in-flight instruction of navigators.

Nature and Purpose of Assignments

Reviews prior training and experience of reserve navigators to determine amount and type of training required to achieve and maintain full qualifications for unit missions. Plans and conducts ground training and airborne instruction in navigational characteristics of unit aircraft, navigation system operating procedures, and application of navigational methods to mission requirements, including the application of emergency procedures.

Instruction programs for navigators include training in the following duties:

- Determining best route to fly, based on established routes, enroute weather conditions, and duration of flight;
- Planning flight to arrive on schedule and avoid adverse weather;

- Using all types of navigational methods and aids, including dead reckoning, pilotage, celestial, radar, inertial, and Doppler navigation;

- Using navigational instruments such as drift meter, pelorus, sextant, radio compass, and loran set;

- Computing effect of various factors on course, flying time, and adequacy of fuel supply;

- Testing and inspecting navigational instruments and making necessary adjustments;

- Maintaining the flight log and providing aircraft position reports;

- Advising pilot of alternate landing area (e.g., in case of adverse weather conditions);
and

- Coordinating as required with other crew members in accomplishing the flying mission.

When assigned as a flight navigator on unit flying missions, performs the above duties.

Flight examining assignments include: evaluating the performance of reserve navigators completing initial training; instructing, evaluating, and examining rated instructors; providing periodic flight evaluations of rated navigators; and administering requalification evaluations. Some flight examiners are designated as standardization/evaluation flight examiners and have additional staff responsibilities related to the overall proficiency of flight crews and adequacy of flight training programs.

Hazard Involved

The degree of hazard involved in the work varies according to the requirements of the particular assignment. Assignments involving point-to-point flying to transport equipment or personnel typically involve a minimum degree of hazard. Other assignments, such as those involving the tactical airdrop of equipment or aerial refueling, involve a substantial degree of hazard while those operations are in progress.

WEAPON SYSTEMS SPECIALIST (INSTRUCTOR), GS-2183-12, BMK #2

Duties

Positions at this level provide ground training and airborne instruction to reserve weapon systems specialists in the appropriate methods and techniques for performing flight crew duties. Assigned missions are related primarily to tactical fighter operations and aerial reconnaissance. In addition, some positions perform flight examining functions as described in the Occupational Information section of the classification standard.

Knowledge and Skills

Knowledge and skills required for performance of the work of this specialization build on the basic air navigational skills and techniques described in the benchmark description for Navigator (Instructor). Because of aircraft and mission related requirements, additional specialized knowledge and skills for these positions include:

- Knowledge of various types of ordnance and its use and deployment, and skill to conduct preflight checks, recognize malfunctions in fire control systems, and coordinate in-flight delivery procedures with the pilot;
- Knowledge of the requirements related to tactical operations (e.g., air-to-air or air-to-ground combat), and skill to effectively meet these requirements during flight;
- Knowledge of the aircraft systems related to weapons delivery, and skill to operate those systems;
- Knowledge of the function and operation of sensor/photo equipment for aerial reconnaissance missions, and skill to plan missions, conduct preflight checks of systems, and employ those systems during flight; and
- Knowledge of aircraft defensive systems and skill to program and operate those systems.

Nature and Purpose of Assignments

The instructor reviews experience and training records of newly assigned reserve weapon systems specialists to determine training required to achieve and maintain full performance level qualifications in flight crew duties. Plans and conducts ground training and airborne instruction in characteristics of unit aircraft, as these relate to the weapons function, aircraft systems operations, navigational instruments and equipment operating procedures, and aircraft emergency procedures.

Instruction programs for weapon systems specialists include training in the following duties:

- Operating aircraft equipment, such as radar, radar warning equipment, bombing timers, or navigation/communication equipment;
- Assisting the aircraft commander in air and ground operations, aircraft intercept, weapons delivery, and reconnaissance;
- Monitoring the aircraft's altitude, airspeed, fuel consumption, weapons status, and flight instruments throughout the mission;
- Utilizing all types of navigational methods of aids, including dead reckoning, visual, optical, and electronic systems;
- Providing flight data, such as headings, track, ground speed, estimated time of arrival, and position;
- Computing bombing data to adjust for altitude, airspeed, wind conditions, and ballistics of bombs;
- Operating and monitoring inertial navigation systems and radar warning equipment for weapons employment and threat identification;
- Programming and operating aircraft defensive systems;
- Monitoring aerial refueling operations; and
- Operating and monitoring sensor/photo systems and equipment for aerial reconnaissance missions.

When assigned as a member of the flight crew, performs the above duties.

Flight examining assignments for this specialization are similar in scope and type of functions to those performed by navigator instructors.

Hazard Involved

The degree of hazard involved in certain of the combat tactical operations is substantial, since it frequently involves low-level, high-speed weapons delivery and gunnery practice.