



Australian Government

AVIH4013 Navigate aircraft under night visual flight rules

Release: 1

AVIH4013 Navigate aircraft under night visual flight rules

Modification History

Release 1. This is the first release of this unit of competency in the AVI Aviation Training Package.

Application

This unit involves the skills and knowledge required to navigate an aircraft under night visual flight rules (NVFR), in compliance with the relevant regulatory requirements of the Civil Aviation Safety Authority (CASA) and national operating standards.

It includes selecting, operating and monitoring navigation aids and systems, navigating aircraft at night, conducting diversions to revised routes or alternate aerodromes at night, and making visual approaches and departures at night. It also includes complying with air traffic control (ATC) rules and procedures for NVFR flights, and managing hazardous weather conditions.

This unit addresses aviation technical skill requirements (physical, mental and task-management abilities) related to route planning and navigation duties of flight crew, and contributes to safe and effective performance in complex aviation operational environments.

Operations are conducted as part of recreational, commercial and military aircraft activities across a variety of operational contexts within the Australian aviation industry.

Work is performed independently or under limited supervision within a single-pilot or multi-crew environment.

Licensing, legislative, regulatory or certification requirements are applicable to this unit.

Use for Defence Aviation is to be in accordance with relevant Defence Orders, Instructions, Publications and Regulations.

Pre-requisite Unit

Not applicable.

Competency Field

H – Route Planning and Navigation

Unit Sector

Not applicable.

Elements and Performance Criteria

ELEMENTS

PERFORMANCE CRITERIA

Elements describe the essential outcomes.

Performance criteria describe the performance needed to demonstrate achievement of the element.

1 Select, operate and monitor navigation aids/systems

- 1.1 Navigation aids and systems appropriate for planned NVFR flight are selected and operated
- 1.2 Ground-based and satellite-based navigational systems confidence and integrity checks are conducted, continuously monitored and maintained

2 Navigate aircraft at night

- 2.1 External aircraft, cockpit and instrument lighting are configured and adjusted to allow reference to documentation, instruments and lookout
- 2.2 Aircraft position fix is determined visually or with reference to navigation aid and systems using ground-based and/or satellite-based navigational systems
- 2.3 Tracks are intercepted to and from stations and waypoints visually or with reference to navigation aids and systems using ground-based and satellite-based navigational systems
- 2.4 Track is maintained within tolerances specified in published procedures
- 2.5 Timings and fuel usage rates are assessed, revised and recorded in navigation log
- 2.6 Situational awareness is maintained using a recognised navigation work cycle
- 2.7 Station passage is recognised
- 2.8 Global navigation satellite system (GNSS)/distance measuring equipment (DME) arc procedure is performed within tolerances specified in published procedures
- 2.9 Planned route above lowest safe altitude (LSALT) is maintained
- 2.10 Route and destination weather conditions are monitored and appropriate actions are executed
- 2.11 Descent point calculations are completed

3 Conduct a diversion

- 3.1 Requirement for an unplanned diversion is recognised and

to revised route or alternate aerodrome at night		confirmed
	3.2	Route to alternate aerodrome, navigation aid and /or revised track is determined
	3.3	Planned route height above LSALT is maintained
	3.4	Flight planned route is diverted to track to alternate aerodrome or navigation aid
	3.5	Operational information for alternate aerodrome/s is reviewed and applied in accordance with regulations and published procedures
	3.6	Fuel plan is reviewed and amended in accordance with regulations and published procedures
4 Make visual departure at night	4.1	Obstacle clearance is maintained visually at all times during departure until reaching LSALT
	4.2	Departure track is intercepted within 5 nautical miles (nm) of aerodrome
	4.3	Take-off and departures are conducted from aerodromes remote from ground lighting using instruments as the primary reference and ensuring after take-off checks are performed at a safe height
5 Make visual approach at night	5.1	Descent below LSALT is conducted in accordance with published procedures
	5.2	Track is maintained to destination aerodrome
6 Comply with ATC rules and procedures for NVFR flights	6.1	Separation from other air traffic under NVFR is maintained
	6.2	Airspace requirements are complied with
	6.3	Two-way communication is maintained with air traffic services and other aircraft
	6.4	ATC clearances and/or radar vectoring instructions are complied with
7 Manage hazardous weather conditions	7.1	Hazardous weather conditions are identified and risk management processes are applied to maintain safety of flight
	7.2	Hazardous weather avoidance procedures are applied
	7.3	Aircraft systems are employed to mitigate the effects of

hazardous weather

Foundation Skills

Foundation skills essential to performance are explicit in the performance criteria of this unit of competency.

Range of Conditions

Range is restricted to essential operating conditions and any other variables essential to the work environment.

Unit Mapping Information

This unit replaces and is equivalent to AVIH4013A Navigate aircraft - NVFR.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=4725260a-0af3-4daf-912b-ef1c2f3e5816>

Assessment Requirements for AVIH4013 Navigate aircraft under night visual flight rules

Modification History

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Performance Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria on at least one occasion and include:

- adapting to differences in equipment and operating environment in accordance with standard operating procedures
- applying air safety practices and regulations
- applying altimetry procedures to all stages of a night visual flight
- applying operational requirements that apply to planning a flight on the basis of conducting an area navigation (RNAV) global navigation satellite system (GNSS) procedure at the destination
- applying relevant aeronautical knowledge
- applying relevant legislation and workplace procedures
- calculating heading to steer to intercept a new or original track to or from a non-directional beacon (NDB)
- calculating heading to steer to intercept desired inbound track before reaching an NDB
- calculating LSALT for a night visual flight for a route published on a chart
- calculating LSALT when uncertain of position
- calculating relative bearing that will indicate a desired track to or from an NDB has been intercepted, given the intercept heading
- calculating the heading to steer to intercept a new or original track to or from a Very High Frequency (VHF) Omni Directional Radio Range (VOR)
- calculating track to and from an NDB, given heading and relative bearings
- communicating effectively with others
- completing relevant documentation
- determining NDB station passage, abeam NDB station, NDB bearing the aircraft is on, track error and/or drift experienced, from an automatic direction finder (ADF) relative bearing indications
- determining off-track distance experienced from VOR and distance measuring equipment (DME) cockpit indications
- determining route for night visual flight with respect to:
 - forecast weather
 - controlled airspace including prohibited, restricted and danger (PRD) areas
 - specified route limitations

- airways operational requirements
- availability of published routes
- en route alternate aerodromes
- navigation aids
- rated coverage
- radio communication
- determining scalloping, VOR station passage, abeam VOR station, VOR radial the aircraft is on, track error and/or drift experienced, from VOR cockpit indications
- determining flight calculations:
 - time made good (TMG)
 - ground speed (GS)
 - estimated time of arrival (ETA)
 - time and distance to waypoint (WPT)
 - wind velocity (WV) in flight
- determining whether a flight may proceed based on route, aircraft equipment and NVFR navigation requirements
- identifying and correctly using equipment required when navigating an aircraft under NVFR
- implementing contingency plans
- implementing work health and safety (WHS)/occupational health and safety (OHS) procedures and relevant regulations
- interpreting DME or GPS arrival information
- interpreting typical GPS navigational displays latitude/longitude, distance and bearing to waypoint, course deviation indications (CDI)
- implementing aviation risk management processes to minimise, control or eliminate hazards that may exist while navigating an aircraft under NVFR
- maintaining compliance with regulatory requirements
- maintaining interception and maintenance of GNSS defined tracks
- managing abnormal operations and emergency procedures in control area (CTA), control zone (CTR), or Class G airspace and at non-controlled aerodromes
- modifying activities depending on workplace contingencies, situations and environments
- monitoring and anticipating operational problems and hazards and taking appropriate action
- monitoring work activities in terms of planned schedule
- operating electronic communications equipment to required protocol
- performing DME procedures:
 - fixing position, given cockpit instrument indications utilising two VHF omni directional radio range (VOR) stations
 - fixing position, given instrument indications utilising combinations of VOR, non-directional beacon (NDB) and DME
 - fixing position, given relative bearing indications utilising two NDB stations
- performing NDB approaches:
 - calculating heading to steer to intercept a new or original track to or from an NDB
 - calculating heading to steer to intercept desired inbound track before reaching an NDB

- calculating relative bearing that will indicate desired track to or from an NDB has been intercepted, given the intercept heading
- calculating track to and from an NDB, given heading and relative bearings
- determining NDB station passage, abeam NDB station, NDB bearing the aircraft is on, tracking error and/or drift experienced, from ADF relative bearing indications
- fixing position, given relative bearing indications utilising two NDB stations
- performing GNSS procedures:
 - interpreting DME or GNSS arrival information
 - interpreting typical GNSS navigational displays including latitude/longitude, distance and bearing to waypoint, CDI
- performing VHF omni directional radio range (VOR) approaches:
 - calculating the heading to steer to intercept a new or original track to or from a VOR
 - determining off-track distance experienced from VOR and DME cockpit indications
 - determining scalloping, VOR station passage, abeam VOR station, VOR radial the aircraft is on, tracking error and/or drift experienced, from VOR cockpit indications
 - fixing position, given cockpit instrument indications utilising two VOR stations
 - fixing position, given instrument indications utilising combinations of VOR, NDB and DME
- performing NVFR navigational functions within the parameters of authorised regulations, orders and operations manual procedures
- predicting availability of approach receiver autonomous integrity monitoring (RAIM) at destination or alternate aerodrome and limitations that apply to the prediction
- reading, interpreting and following relevant regulations, instructions, procedures, information and signs
- recognising and taking appropriate action for GNSS warnings and messages
- recognising significant variances from forecast meteorological conditions and taking appropriate actions, including issuing an air report (AIREP)
- reporting and/or rectifying problems, faults or malfunctions promptly, in accordance with workplace procedures
- selecting and using required personal protective clothing and equipment conforming to industry and WHS/OHS standards
- sourcing and interpreting aviation weather forecast products and services appropriate to flight planning and navigation procedures
- working systematically with required attention to detail without injury to self or others, or damage to goods or equipment.

Knowledge Evidence

Evidence required to demonstrate competence in this unit must be relevant to and satisfy all of the requirements of the elements and performance criteria and include knowledge of:

- abnormal operations and emergency procedures in CTA, CTR, Class G airspace and at non-controlled aerodromes
- aerodrome landing area (ALA) or helicopter landing site (HLS) dimension and lighting requirements for fixed or rotary wing NVFR operations
- aerodrome operations where surrounding light is limited
- airways clearance requirements for entering, operating in and departing CTA and CTR, including what details to provide to air traffic control (ATC), and what details to expect from ATC
- airways clearance requirements for operating in all classes of airspace, including lead time required for flight plan submission, contents, clearance void time, and read back requirement
- alternate aerodrome planning requirements
- altimetry procedures to all stages of a night visual flight
- ATC procedures relevant to NVFR operations
- ATC requirements for a change of level in CTA, including in an emergency
- compulsory reporting points for route selected
- controlled area protection
- departure, climb, transition to cruise (levelling out), cruise, change of levels, descent and visual approach procedures at night, in CTA, CTR, Class G airspace and at non-controlled aerodromes
- dimensions of the significant safety sector when calculating lowest safe altitude (LSALT) for a route not published on a chart
- distance measuring equipment (DME):
 - DME or GNSS arrival information
 - DME or GNSS arrival procedures and limitations in all classes of airspace
 - pilot responsibilities when DME or GNSS arrival is conducted outside controlled airspace
 - conditions permitting descent below LSALT
 - procedure for joining circuit using a DME or GNSS arrival
 - principles of operation of DME or GNSS radio equipment
 - procedures for handling loss of radio communication during a DME or GNSS arrival
- explanation of conditions for descent below LSALT
- GNSS:
 - principles of operation, performance limitations and errors of a GNSS system
 - methods of position fixing using a GNSS system
 - GNSS operating procedures for typical navigational tasks using a specific type of aircraft equipment
 - GNSS operating procedures that provide safeguards against navigational errors and loss of situational awareness

- indications of waypoint passage
- GNSS operational and serviceability checks
- human factor limitations associated with using GNSS equipment
- requirements applicable to pilots and equipment for GNSS operations
- parameters applicable to tracking tolerances, automatic waypoint sequencing, CDI sensitivity and RAIM availability
- mode of operation required during each segment of a GNSS/NPA, conditions required to transition to and operate in that mode, and associated CDI sensitivity and RAIM protection provided
- parameters applicable to RAIM warnings in en route, terminal and approach modes
- effect of availability or otherwise of baro-aiding on RAIM availability and prediction
- effect of satellite unserviceability on reliability of each type of prediction
- effect of each type of RAIM prediction operational requirements
- operational requirements that apply to planning a flight on the basis of conducting a RNAV (GNSS) procedure at the destination
- factors that may adversely affect the conduct of a GNSS/NPA and explain suitable pilot procedures to minimise such effects
- operating procedures for GNSS equipment that reduce or eliminate errors due to any of these factors
- human factors and physiological limitations for conducting NVFR operations
- loss of radio communication procedures in CTA, CTR, Class G airspace and at non-controlled aerodromes
- maximum permissible time interval in between ATC transmissions during radar vectoring
- methods of establishing and calculating LSALT:
 - from published charts
 - for route not published
 - position uncertainty
- minimum NVFR aircraft equipment requirements
- navigation requirements for a night visual flight using radio, self-contained or long-range navigation systems
- navigation requirements for a night visual flight using visual reference to ground and water
- navigation requirements for night visual flight with respect to time interval between fixes, accuracy of time reference, and accuracy and procedures in track-keeping
- navigation route requirements for NVFR:
 - forecast weather
 - controlled airspace (CTA)
 - prohibited, restricted and danger areas (PRD)
 - engine out performance for multi-engine aircraft
 - specified route limitations
 - airways operational requirements
 - availability of published routes

- en route
- alternate aerodromes
- navigation aids
- rated coverage
- radio communication
- navigation tolerance for a night visual flight avoiding CTA
- NDB:
 - effects of coastal refraction, night error, thunderstorms, mountainous areas, types of terrain and altitude of aircraft on NDB indications or range
 - methods of selecting and using the most appropriate NDB for tracking during navigation
 - NDB position fixing, tracking techniques, procedures and limitations
- operation of VHF aerodrome lighting pilot activated lighting (PAL)
- pre-flight altimeter accuracy check for a night visual flight
- principles of operations, limitations and errors for NVFR radio navigation systems
- privileges and limitations of NVFR rating
- procedures of night visual flight in all classes of airspace when diverting from track due to navigation or weather
- radar emergency procedures, including loss of radio communication, radar failure, transponder emergency codes, and aircraft emergencies
- radar services that are provided by ATC
- radar vectoring procedures, including radio procedures and phraseologies
- radio procedures in CTA, CTR, Class G airspace and at non-controlled aerodromes
- requirements and procedure for a diversion to an alternate aerodrome
- requirements for departure and descent for clearance from terrain
- requirements for positive radio fixing and the most precise track guidance
- separation provisions between NVFR flights, and IFR and VFR flights in the various classes of CTA
- separation provisions between NVFR flights, and IFR and VFR flights in GAAP CTR
- VHF omni directional radio range (VOR):
 - VOR instrument settings required to provide command indications when flying on given tracks both to and from the VOR
 - VOR tracking techniques, procedures and limitations.

Assessment Conditions

As a minimum, assessors must satisfy applicable regulatory requirements, which include requirements in the *Standards for Registered Training Organisations* current at the time of assessment.

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assessment.

Assessment processes and techniques must be appropriate to the language, literacy and numeracy requirements of the work being performed and the needs of the candidate.

Assessment must occur in workplace operational situations. Where this is not appropriate, assessment must occur in simulated workplace operational situations that reflect workplace conditions.

Resources for assessment must include access to:

- a range of relevant exercises, case studies and/or simulations
- acceptable means of simulation assessment
- applicable documentation including workplace procedures, regulations, codes of practice and operation manuals
- relevant materials, tools, equipment and personal protective equipment currently used in industry.

Links

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