



Australian Government

DEFSUR006 Navigate using celestial aids

Release: 1

DEFSUR006 Navigate using celestial aids

Modification History

Release	Comments
1	This unit was released in DEF Defence Training Package release 1.0 and meets the Standards for Training Packages. This unit supersedes and is equivalent to DEFSU012 Navigate using celestial aids. • Unit code updated • Content and formatting updated to comply with new standards • All PC transitioned from passive to active voice • PC 1.3, 5.2 and 6.2 revised • PC 3.3 and 3.4 merged

Application

This unit describes the skills required to navigate using celestial aids, by both day and night, to a destination, within standard tolerances of accuracy, without the use of the normal range of navigation aids.

This unit was developed for military personnel required to operate in a remote, deployed operational environment, but is applicable to any individual who is required to navigate using celestial aids. Alternatively, if an approximate position is known relative to a highway, waterway or coast, where either survival or rescue is better effected, the individual will have sufficient skills and knowledge to remain on a constant bearing and estimate distance travelled.

The skills and knowledge described in this unit must be applied within the legislative, regulatory and policy environment in which they are carried out. Organisational policies and procedures must be consulted and adhered to.

Those undertaking this unit would act autonomously, while performing concrete tasks, in a broad range of contexts which may be highly unpredictable.

No licensing, legislative or certification requirements apply to unit at the time of publication.

Competency Field

Survival

Elements and Performance Criteria

ELEMENTS	PERFORMANCE CRITERIA
Elements describe the essential outcomes	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the range of conditions section.
1. Establish cardinal points by day using the sun	1.1 Construct a sun compass in an open and level area to record complete movement of the sun over a solar day. 1.2 Mark true north, associated cardinal points and the arc of the sun on the sun compass. 1.3 Mark true north and associated cardinal points using a quick shadow stick method (maximum of twenty minutes of solar transit) and making allowance for the deviation arising from early morning or late afternoon siting.
2. Establish cardinal points by night using celestial aids	2.1 Extrapolate the location of cardinal points by identifying and using celestial bodies. 2.2 Extrapolate the location of the celestial pole by identifying and using celestial bodies. 2.3 Extrapolate true south (or north) by using the celestial pole on the earth/sky horizon and by establishing a compass showing all cardinal points on the ground.
3. Employ improvised direction measuring techniques	3.1 Select appropriate direction of travel to optimise survival or rescue, after analysing the survival situation. 3.2 Construct an improvised protractor using a multi-folded sheet of paper and mark the desired angle of direction. 3.3 Use established cardinal points and directional markings on an improvised protractor to navigate towards a recognisable feature in the distance.
4. Employ improvised time measuring techniques	4.1 Estimate elapsed time by measuring the angle of a segment of the sun's transit and applying an angle by rate calculation. 4.2 Estimate elapsed time by measuring the rotation of a celestial body around the celestial pole, and applying an angle by rate calculation.
5. Employ improvised distance measuring techniques	5.1 Estimate distance by counting number of paces taken and applying a pace by length of pace calculation. 5.2 Estimate distance by travelling at constant estimated velocity walking pace of four km/h and applying a velocity by time calculation.
6. Determine overall position relative to start point and	6.1 Draw grid system using a standard scale on a sheet of paper, and mark cardinal points and start point. 6.2 Draw physical navigation movements as scaled vectors from the start point.

navigate back	6.3 Aggregate individual navigation vectors to determine final position relative to the start point. 6.4 Determine return vector, including bearing and distance, to return to the start point.
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Foundation Skills

The foundation skills demands of this unit have been mapped for alignment with the Australian Core Skills Framework (ACSF). The following tables outline the performance levels indicated for successful attainment of the unit.

ACSF levels indicative of performance:

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Learning N/A					Reading N/A					Writing N/A					Oral communication N/A					Numeracy				

Performance variables

1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Support					Context					Text complexity					Task complexity				

Further information on ACSF and the foundation skills underpinning this unit can be found in the Foundation Skills Guide on the GSA website.

Unit Mapping Information

This unit supersedes and is equivalent to DEFSU012 Navigate using celestial aids.

Links

Companion Volume implementation guides are found in VETNet -

<https://vetnet.gov.au/Pages/TrainingDocs.aspx?q=6bdbab1e-11ed-4bc9-9cba-9e1a55d4e4a9>

Companion Volume implementation guides are found in VETNet -

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Assessment Requirements for DEFSUR006 Navigate using celestial aids

Modification History

Release	Comments
1	These Assessment Requirements were released in DEF Defence Training Package release 1.0 and meet the Standards for Training Packages. Assessment Requirements created drawing upon specified assessment information from superseded unit

Performance Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the candidate must demonstrate evidence of performance of the following on at least one occasion.

- identifying celestial bodies
- navigating
 - five kilometres within a solar day, which may be broken into legs of not less than one kilometre, but must include at least four legs, as part of a navigation circuit; on completion, navigators are to submit a vector diagram detailing their final position relative to their start point accurate to within 10% (of distance and direction)
 - five kilometres within eight hours at night, which may be broken into legs of not less than one kilometre, but must include at least four legs, as part of a navigation circuit; on completion, navigators are to submit a vector diagram detailing their final position relative to their start point accurate to within 10% (of distance and direction)
- locating cardinal points and true north
 - by day: make adjustments for the shadow arc, dependent upon the time, when using only a partial segment of a solar day (maximum twenty minute fix) to locate the cardinal points; and to indicate true north to within 10% with a sun compass, using a twenty minute fix
 - by night: implement contingency skills when there is partial cloud in the night sky; and to employ five different celestial body indication techniques to locate the cardinal points, either directly or through extrapolation via the celestial pole

Knowledge Evidence

Evidence required to demonstrate competence must satisfy all of the requirements of the elements and performance criteria. If not otherwise specified the depth of knowledge demonstrated must be appropriate to the job context of the candidate.

- angles (in degrees)
- basic physics (velocity/distance/time)
- cardinal points (magnetic and true)
- earth's orbit and rotation in relation to the sun and night sky, including the celestial pole phenomenon
- mathematical calculations including:
 - distance travelled:
 - velocity x time
 - pace length x number of paces
 - elapsed time:
 - rate of (apparent) movement of sun (15 degrees/hour x solar angle subtended)
 - rate of (apparent) movement of night sky around the celestial pole (15 degrees/hour x angle subtended by nominated celestial body)
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Assessment Conditions

Competency should be assessed in an actual workplace or in a simulated environment, with access to equipment and infrastructure appropriate to the outcome. Competency should be demonstrated over time to ensure the candidate is assessed across a variety of situations. Competency must be assessed in an area that has an unmodified landscape, with access to pen and paper.

Assessors must satisfy the NVR/AQTF mandatory competency requirements for assessors.

Links

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