TASK 402

LIFE CYCLE ENVIRONMENTAL PROFILE (LCEP)

402.1 Purpose. The LCEP is to be prepared no later than the early part of the Technology Development phase and will aid in the development of the CONOPS, SRD, ICD, CDD, and the CPD. The LCEP, prepared by an environmental engineering specialist (combat/materiel developer staff or contractor), identifies and characterizes environments or combinations of environments to which the materiel could be exposed throughout its service life. Use the LCEP as the baseline document to support design and test activities throughout the materiel development process.

402.2 Task description. This is one of three tasks (Task 402, 403, and 404) that make up the Environmental Test and Evaluation Master Plan (ETEMP). The LCEP accurately describes real-world environmental conditions that are relevant to the materiel being developed. It provides a consistent baseline for design and test decisions regarding materiel performance and survival under realistically outlined operational environmental conditions. As such, it should not contain conservatism factors, parameter exaggeration, or test procedures that will be covered by other tasks. The LCEP is a living document that should be reviewed and updated periodically as new information regarding operational environmental conditions becomes available. A comparable NATO document, Allied Ordnance Publication 15 (AOP-15), "Guidance on the Assessment of Safety and Suitability for Service of Non-Nuclear Munitions for NATO Armed Forces" (1998), provides methodology to define specific details of the service environments, and to identify appropriate testing to demonstrate that munitions will perform acceptably under those conditions.

402.2.1 Contents of an LCEP. As a minimum, perform the following subtasks and include subtask products in the LCEP:

a. Describe the anticipated logistical and operational events associated with the materiel from the time of final factory acceptance until the end of its useful life. Include description in the LCEP.

b. Develop a list of significant natural and induced environments or combinations of environments associated with each of the events described in "a" above, and include the list in the LCEP.

c. Prepare narrative, tabular, graphic, and statistical characterizations, to the extent practical, of the environmental stress conditions identified in "b" above. These characterizations may be a combination of analytical calculations, test results, and measurements on materiel systems in service. Include characterizations in LCEP.

402.2.2 Special considerations. When appropriate in developing the LCEP, describe the following special considerations along with any others that may apply, and include their descriptions in the LCEP:

a. Anticipated materiel configuration (s) during manufacturing, handling, repair/rework, environmental stress screening (ESS), and transport.

b. Environments to be encountered and their associated geographical and physical locations.

c. Packaging/container designs/configurations.

d. Platform on which the materiel is mounted, stored, or transported.

e. Structural, operating, and other interfaces with adjacent materiel.

f. Absolute and relative durations of exposure to environmental conditions in each life cycle phase, as well as any other circumstances of occurrence.

g. Number of times each life cycle phase is expected to occur and its frequency or likelihood of occurrence.

h. Anticipated limitations and critical values that the environment may have on the materiel because of materiel design or natural laws (e.g., fog or other precipitation may inhibit the effectiveness of infrared sensors).

402.3 Details to be provided by the acquisition agency. The LCEP must be the product of the shared knowledge of both the materiel supplier and the acquisition agency. The acquisition agency must provide, as a minimum:

a. A thorough description of all anticipated logistical and operational events associated with the materiel from the time of final factory acceptance until its terminal expenditure, removal from the inventory, and demilitarization. Include:

(1) Geographical areas of service or deployment.

(2) Platforms on which the materiel will be mounted, stored, or transported.

(3) Actual measurements of environmental conditions related to the same or similar materiel and platforms.

(4) Concept of Operation (CONOPS)

b. Schedule and procedures for LCEP submittal.

c. Identification as a contract task or submittal.

d. Special conditions or restrictions.

402.4 Life Cycle Environmental Profile Questionnaire. To aid in the development of the CONOPS, SRD, ICD, CDD, and the CPD, the following questionnaire may be used to identify the planned environments and possible induced external influences during the in-service life of the materiel. The questionnaire is divided into eight sections, two main tables and six supplemental tables. Section 1 provides basic information about the materiel and should be used to identify the general purpose of the materiel. The response to the directions in sections 2 through 7 will be dependent upon the way the materiel will be stored, transported or serviced. This response can be filled out in Tables A and B. Some of the information in these tables will require more detailed information which can be filled out in tables C through H. The final question in section 8 is applicable any time. In the following questions, information should be provided if there is even a minimal chance of exposure to the respective environment. Annex C, Table C-II through C-IV contains a detailed list of environmental forcing functions an item may encounter throughout its storage, transportation, and deployment phase.

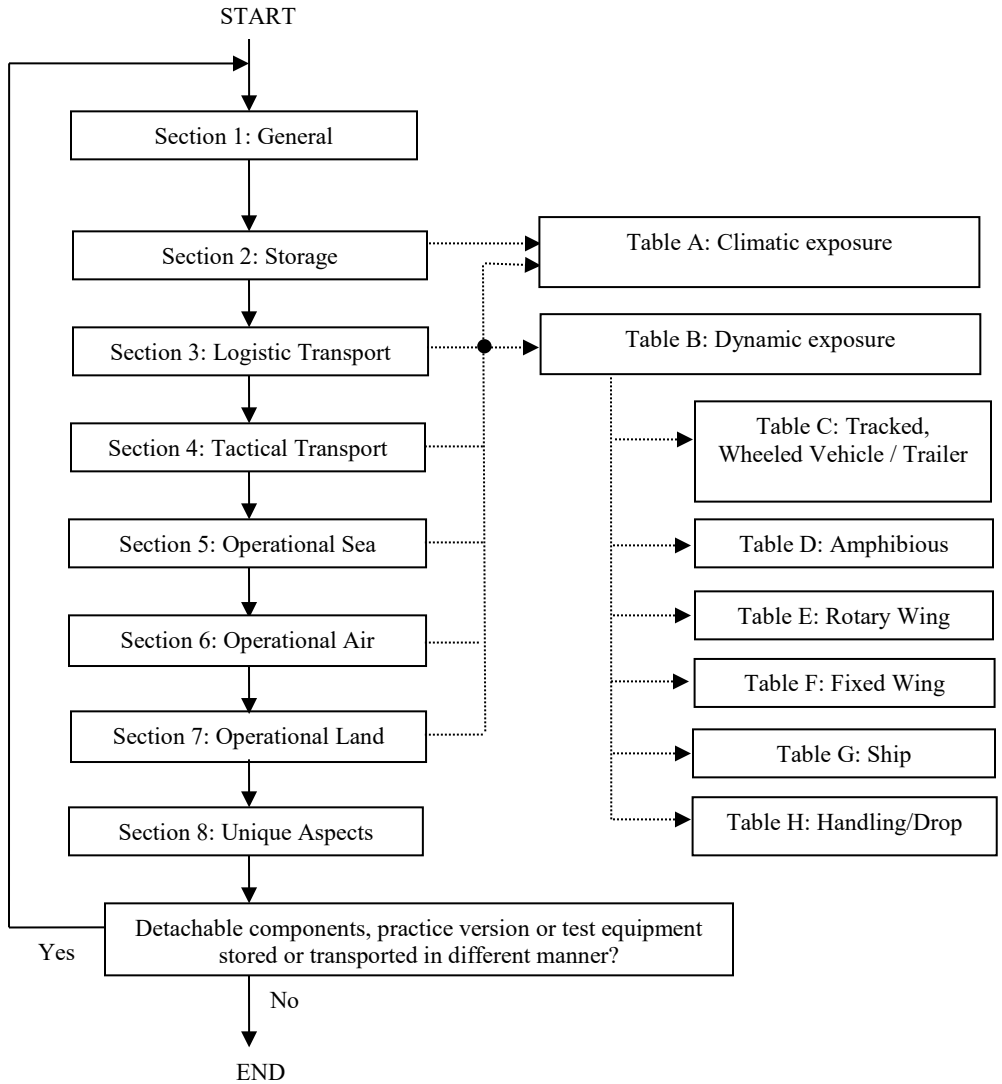

Figure 402-1. Life Cycle Environmental Profile Development Guide

Section 1: General

No.	Question	Response
1.1	State whether one of the following is applicable for the item: a. detachable components b. practice version available c. in service assembly d. necessary test equipment Will those parts / items be stored and transported separately and/or in a different manner? If so, fill out the questionnaire for each item or component separately.	
1.2	Which of the Services are likely to use this item?	
1.3	State whether the item will be operated from inside an enclosure?	Y / N
1.4	What is the intended total lifetime for this item (including disposal)?	
1.5	May the life be achieved by replacing short-life components during service?	Y / N
1.6	What will be done with items that exceed their service life? (see AECTP-600 for evaluating extended life requirements)	
1.7	If packaged, describe the packaging or protection intended for each of the following situations: a. storage b. transit c. during operation d. any other purpose? Specify role.	Specify: a. b. c. d.
1.8	Is the item or packaging required to be water tight or vapor tight? If yes, will a desiccant be used?	Y / N
1.9	Is the item required to be capable of functioning after exposure to an Electro Magnetic Pulse (exo- or endo-atmospheric)?	Y / N
1.10	Could the item be influenced by other surrounding equipment, like Electromagnetic field(s)?	Y / N

Section 2: Storage

No.	Direction	Completed by
2.1	Complete the storage column of Table A. Climatic zones are described in Part One, Annex C and Part Three of this standard. The storage column of Table A should be completed for all types of storage including storage associated with other phases of the life cycle.	Name: Date:

Section 3: Logistic Transport

For this section it is assumed that the item is in its logistic packaging or configured for logistic transport. Logistic packaging is intended for transport of, mostly larger amounts of, items to or from the National storage locations. This packaging can vary in the degree of protection it provides for the packaged item, and may or may not contain sub packaging. For transport configuration it is possible that the item will be folded (down), disassembled or provided with a cover or protection.

If these instructions do not cover every situation, please go to the tactical transport section.

No.	Direction	Completed by
3.1	Complete the Logistic Transport column of Table A. Although this requires durations, it may be sufficient to merely indicate the climatic category if these are not known.	Name: Date:
3.2	Complete the Logistic Transport column of Table B and the relevant supplemental tables.	Name: Date:

Section 4: Tactical Transport

For this section it is assumed that the item is in its logistic or tactical packaging or configured for tactical transport. If these questions do not cover any situation, please go to operational sections.
Tactical packaging is intended for transport, over (multiple) shorter distance(s), just before or during operational use. This packaging, mostly, provides less protection than the logistical packaging.

No.	Direction / Question	Response
4.1	Complete the Tactical Transport column of Table A. Although this requires durations, it may be sufficient to merely indicate the climatic category if these are not known.	Completed by
4.2	Complete the Tactical Transport column of Table B and the relevant supplemental tables.	Completed by
4.3	Will the item be transferred at sea horizontal (jackstay) replenishment and in what packaged state?	Y/N

Section 5: Operational Sea

No.	Direction	Completed by
5.1	Complete the Operational Sea column of Table A.	Name: Date:
5.2	Complete the Operational Sea column of Table B and the relevant supplemental tables.	Name: Date:

Section 6: Operational Air

No.	Direction	Completed by
6.1	Complete the Operational Air column of Table A. Indicate respective exposure in each climatic category for the following: a. standby (on the ground/flight deck) b. operating (carriage at altitude)	Name: Date:
6.2	Complete the Operational column of Table B and the relevant supplemental tables.	Name: Date:

Section 7: Operational Land

No.	Direction	Completed by
7.1	Complete the Operational Land column of Table A. Indicate respective exposure in each climatic category for the following: a. standby or installation b. operating or in use	Name: Date:
7.2	Complete the Operational column of Table B and the relevant supplemental tables.	Name: Date:

Section 8: Unique Aspects

No.	Question	Response
8.1	Is there any situation, condition or external influence which might be expected during the lifetime of the item which is not addressed in the questionnaire?	Detail:

Table A : Climatic Exposure

Environment	Climatic Zone	Duration[1] (Indicate the duration of expected exposure for each phase of the Life Cycle)									Other Information
		Storage[2]	Logistic Transport	Tactical Transport	Operational Sea		Operational Air		Operational Land		
					Standby	Operating	Standby	Operating	Standby	Operating	
High Temperature	A1										
	A2										
	A3										
	M1										
	M2										
Low temperature	C0										
	C1										
	C2										
	C3										
	C4										
	M3										
Solar Radiation	A1										
	A2										
	A3										
	M1										
	M2										
Humidity	B1										
	B2										
	B3										
	M1										
	M2										

[1] When considering durations for the climatic zones, include all possible deployments and the potential return to storage.
[2] Storage phase includes long term, short term in theater, and forward base.

Table A (Continued): Climatic Exposure

Environment	Requirement (indicate during which life cycle phase each environment may occur)										Duration (if known)	Other Information
	Storage	Logistic Transport			Tactical Transport			Operational				
		Sea	Air	Land	Sea	Air	Land	Sea	Air	Land		
Thermal shock												
Immersion												
Fungal Growth												
Salt Fog												
Rain												
Icing												
Pressure (Altitude)												
Sand and Dust												
Contamination by Fluids												
Freeze/Thaw												

Table A (Continued): Climatic Exposure

Environment	Requirement (indicate during which life cycle phase each environment may occur)										Duration (if known)	Other Information
	Storage	Logistic Transport			Tactical Transport			Operational				
		Sea	Air	Land	Sea	Air	Land	Sea	Air	Land		
Explosive Atmosphere												
Acidic Atmosphere												
Wind												
Green Sea Loading												

Table B : Dynamic Exposure

Category	Mechanical environment	Table [1]	Units	(Indicate the expected exposure for each phase of the Life Cycle) Logistic Transport	Tactical Transport	Operational		Details	Other Information / References [2]
Vibration	Wheeled vehicle / 4-wheeled trailer	C	(km)						
	Tracked vehicle		(km)						
	2-wheeled trailer		(km)						
	Amphibious	D	(km)						
	Rotary wing	E	(hr)						
	Fixed wing	F	(hr)						
	Railroad		(km)						
	Ship-board	G	(days)						
	Submarine		(days)						
	Acoustic		Y/N?					Severe acoustic environment? (> 140 dB)	
	Other		(km) or (hr)						
Shock	Handling / Drop	H		Y	Y	Y			
	Munition Launch		Y/N?						
	Air delivery (parachute)		Number?					Packaged state?	
	Catapult Launch / Recovery		Y/N?						
	Adjacent launch		(rounds)					Specify adjacent munition	
	Pyrotechnic		Y/N?					Specify near / far field	
	Gunfire		(rounds)					Specify gun	
	Ballistic		Y/N?					Survivability of indirect ballistic impact	
	Undex		Y/N?					Still safe and suitable?	
	Rail impact		Y/N?						
Acceleration	Constant		(g)					Max g?	

Note [1] : Complete Tables for each type / variant identified.
Note [2] : Provide other information /references as relevant.

Table C : Tracked or wheeled vehicle / trailer

Type/ Variant [1]		
Terrain	On road	Off road
Logistic		
Distance		
Avg Speed		
Max Speed		
Tactical		
Shock mounting	Y / N?	Y / N?
Secured cargo	Y / N / Both?	Y / N / Both?
Distance		
Avg Speed		
Max Speed		
Operational		
Shock mounting	Y / N?	Y / N?
Secured cargo	Y / N / Both?	Y / N / Both?
Distance		
Avg Speed		
Max Speed		

[1] *To be filled out for each type/variant*

Table D : Amphibious vehicle

Type/ Variant [1]			
Terrain	Water[2]	On-road	Off-road
Logistic			
Distance			
Avg Speed			
Max Speed			
Tactical			
Shock mounting	Y / N?	Y / N?	Y / N?
Distance			
Avg Speed			
Max Speed			
Operational			
Shock mounting	Y / N?	Y / N?	Y / N?
Distance			
Avg Speed			
Max Speed			

[1] *To be filled out for each type/variant*

[2] *Complete the water environment for sea and river/littoral if applicable.*

Table E : Rotary Wing

Type/ Variant [1]	
Logistic	
Duration internal [hrs]	
Duration underslung [hrs]	
Delivery at sea (vertical replenishment)	Y / N, Specify sea state
Tactical / Operational	
Duration once [hrs]	
Duration cumulative [hrs]	
Adjacent stores	Y / N, Specify adjacent stores
Projected mission profile	
Number of take off's / landings	
Cruise [% of operational duration]	
Tactical Maneuver [% of operational duration]	
Attack [% of operational duration]	
Show of force [% of operational duration]	

[1] *To be filled out for each type/variant*

Table F : Fixed Wing

Type/ Variant [1]	
Logistic	
Duration [hrs]	
Tactical / Operational	
Duration once [hrs]	
Duration cumulative [hrs]	
Adjacent stores	Y / N, Specify adjacent stores
Projected mission profile	
Number of take off's / landings	
Cruise [% of operational duration]	
Tactical Maneuver [% of operational duration]	
Attack [% of operational duration]	
Show of force [% of operational duration]	

[1] *To be filled out for each type/variant*

Table G : Shipboard

Type/ Variant [1]	Duration [days]		
	Logistic	Tactical	Operational
Masthead			
Exposed upper deck			
On or adjacent to a flight deck or helicopter landing pad			
On or near a designated vehicle park			
Protected compartment			
Hull, below water line			

[1] *To be filled out for each type/variant*

Table H : Handling / Drop

Handling / Drop category[1]		Logistic transport		Tactical transport / Operational	
		Packaged	Unpackaged	Packaged	Unpackaged
Ship transport	Y / N?				
Man carried					
Forklift					
Crane					
Vehicle (un)loading					
Bench handling					
Other	Specify:				

[1] If known, state specific height for above environment.