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## Korea Lunar Exploration Program DTN

### Declared Processes List for SBC

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## **REVISION / CHANGE RECORD**

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## **1. INTRODUCTION**

This Declared Processes List (DPL) includes a common and complete list of all Processes used for manufacturing and integration of Single Board Computer (SBC). It has been prepared according to Subcontractor Product Assurance Requirements (AD-1) & ECSS-Q-ST-70 (RD-4). The purpose of the DPL is to provide a control of the processes, which are foreseen to be applied.

Furthermore it provides an overview for the processes usability and acceptability with the project Subcontractor Product Assurance Requirement. Each process is listed with the information about its application, specification and reference to the items in the materials list. The processes have to be suited for the selected materials and the further manufacturing, integration and test. Critical Processes will be tracked and controlled by the Critical Items List (CIL). The list formats are prepared according to in-house formats reflecting all necessary information for identification, specification, and description of the identified processes.

The list status reflects the actual design status. The DPL is under configuration control, initiated for the relevant configuration items at the beginning of the baseline design and updated according to the project milestones. Line item numbers will not be changed; if a part will be deleted it must be indicated by 'deleted' without giving the number to another item. An overview of the SBC configuration Item and the industrial responsibilities are depicted below:

The list provides other information concerning the specification of the processes in a manner which meets the requirements of KPLO.

## 2. APPLICABLE & REFERENCE DOCUMENTS

Unless an explicit document version reference is given, the latest official version at the time of contract shall be assumed.

### 2.1 APPLICABLE DOCUMENTS

This document will be read in conjunction with document listed hereafter, which form part of this document to the extent specified herein. In case of a conflict between any provisions of this document and the provisions of the documents listed hereafter, the content of the contractually higher document will be considered as superseding.

	<b>Document No.</b>	<b>Title</b>
AD-1	KPLO-D0-210-003	User Requirements Document (KARI)
AD-2	KPLO-D0-524-008	User Requirements Document (ETRI)

### 2.2 REFERENCE DOCUMENTS

The following documents contain additional information that is relevant to this document. Subcontractor original document number is given in brackets if not in KARI format.

	<b>Document No.</b>	<b>Title</b>
RD-1	ECSS-M-ST-40	Configuration and information management
RD-2	ECSS-Q-ST-10-09	Non-conformance control system
RD-3	ECSS-Q-ST-20	Quality assurance
RD-4	ECSS-Q-ST-70	Materials, mechanical parts and processes
RD-5	ECSS-Q-ST-70-01	Cleanliness and contamination control
RD-6	ECSS-Q-ST-70-02	Thermal vacuum outgassing test for the screening of space materials
RD-7	ECSS-Q-ST-70-08	Manual soldering of high-reliability electrical connection
RD-8	ECSS-Q-ST-70-38	High-reliability soldering for surface-mount and mixed technology
RD-9	ECSS-Q-ST-70-71	Data for selection of space materials
RD-10	MIL-STD-883	Test Method Standard, Microcircuits

### **3. PROCESSES**

All processes which affect the quality of the flight hardware during manufacturing, integration and test have to be identified and listed concerning their application, procedure/standard execution authority, and criticality.

#### **3.1. SELECTION AND APPROVAL**

Process selection will include the criterion for:

- technical applicability
- suitability for the process
- experience in process control
- availability of trained and skilled personnel
- availability of facilities (tools, machines)

Preference is given to the processes already used successfully for other space programs. The approval of processes will be based on adequate process specifications and procedures and their correct execution verified by the Inspection Report.

#### **3.2. CRITICAL PROCESSES**

Critical processes are defined as those processes determined to have a potential adverse impact on the safety, reliability or quality of the hardware. Such processes will be identified and indicated in this Processes List and suited procedures will be determined to perform these processes and inspect their results by Quality Inspection Report.

Critical Processes are in particular:

That in the case of failure can adversely affect the performance or destroy a major part or function of the space system the quality of which cannot be assessed solely by examining the end product that has caused problems previously with which the contractor in charge of it has had no previous application experience Processes identified as critical have to be implemented in the Inspection Plan, subject to a key inspection and adequate documentation by e. g. Inspection Report.

#### **3.3. PROCESSES EVALUATION**

Processes identified as critical will be subjected to an evaluation program prior to application and approval

- A. Verification and/or demonstration of the process.
- B. Procedures in preparation.
- C. Application of processes.
- D. Training of personnel.

#### **3.4. PROCESSES CONTROL**

The processes will be controlled by the Lumir according to written process specifications/procedures containing the description of technical performance and QA provisions for control.

## 4. FORM SHEET

The structuring and recoding of information are based on the ECSS-Q-ST-70(RD-04).

### 4.1 PROCESS CATEGORIES

The Processes shall be grouped into the following categories.

Group No.	Description
1	Adhesive bonding
2	Composite manufacture
3	Encapsulation/moulding
4	Painting/coating
5	Cleaning
6	Welding/brazing
7	Crimping/stripping/wire wrapping
8	Soldering
9	Surface treatments
10	Plating
11	Machining
12	Forming
13	Heat treatment
14	Special fabrication: processes developed specifically for the programme
15	Marking
16	Miscellaneous processes
17	Inspection procedures

## 4.2 FORM SHEET DESCRIPTION

The applicable form sheet is initiated in reference SPAR(AD-01). The content of the dedicated columns of the format is described as follows:

Column No.	Description
1	Document number for process list
2	Part number of end item
3	Revision status
4	Name of the process
5	Description of the process
6	Documents number of process specification
7	Main parameter of the specification
8	The location where the material is used
9	Flight materials used in the process
10	Process heritage or qualification information

## 5. SUBCONTRACTOR DECLARED PROCESS LIST

Subcontractor information of DPL are provided in as follows:

No.	Process Description	Subcontractor
1	Machining of metal frame	(주)에스엠텍
2	Plating of Al & Al-alloys	(주)코텍
3	Anodizing	(주)코텍
4	Electronic board manufacturing	スマート코리아피씨비(주)
5	Crimping of high-reliability electrical connections	프로메이트(주)

## 6. DECLATED PROCESSES LIST

The declared processes list is presented on the following Appendix A and the data is collated into categories described in section 4.

**APPENDIX A DPL FOR SBC**

**DECLARED PROCESS LIST (DPL)**

Programme name: KPLO DTN			CI no.:			Doc no.: KPLO-D1-554-022		Date: 2018-10-15	
			Group (Title):			Issue/Revision: 1.0		Page: 1	
1	2	3	4	5	7	8	9		10
							9.1	9.2	
Item no. and user code	Process identification	1) User name 2) Associated procedure issue/revision/ date	Process description	1) Subsystem code 2) Equipment code 3) Use	Associated DML or DMPL item number	1) Criticality 2) Reason for criticality	1) Supplier Reference 2) Prime comments	Prime approval status	Customer approval status/ comments
11 001	Metal Machining	1) (주)에스엠테크 2)	Procedure for Machining of Metal Frame	1) SCB 2) 3) Machining of Metal Frame	DML-01-001 Al & Al-alloys	1) N 2)	1) 2)		
10 001	Plating	1) (주) 코텍 2)	LN9368-4301: Chemical Nickel-Phosphorous plating of Al& Al-alloys	1) SCB 2) 3) plating of Al& Al-alloys	DML-12-002 CROMATE	1) N 2)	1) 2)		
4 001	Painting	1) (주) 코텍 2)	Anodic Oxidation	1) SCB 2) 3) thermal regulation paint	DML-12-001 Anodizing	1) N 2)	1) 2)		
14 001	PCB Manufacturing	1) (주)스마트코리아피씨비 2)	electronic board manufacturing	1) SBC 2) 3) PCB assembly	DML-18-001 PCB Arlon 85N	1) N 2)	1) 2)		

9 002	Heat Treatment	1) 루미르(주) 2)	Tempering / Bake out for PCB degassing (humidity)	1) SBC 2) 3) Before Soldering	DML-18-001 PCB material	1) N 2)	1) 2)		
12 001	Foming	1) 씨트랙 아이 2)	Fine-pitch lead forming	1) SBC 2) 3) Assembly of SMDs	SMD Parts	1) N 2)	1) 2)		
8 001	Soldering	1) 루미르(주) 2)	Degolding and Prefinning of electrical parts in the clean room	1) SBC 2) 3) Assembly of SMDs	DML-07-003 Solder Bar	1) N 2)	1) 2)		
8 002	Soldering	1) 루미르(주) 2)	Solder paste application with stencil printing	1) SBC 2) 3) Assembly of SMDs	DML-07-001 Solder paste	1) N 2)	1) 2)		
8 003	Soldering	1) 루미르(주) 2)	High-reliability soldering for surface-mount and mixed technology	1) SBC 2) 3) Assembly of SMDs	DML-07-001 Solder paste	1) N 2)	1) 2)		
8 004	Soldering	1) 루미르(주) 2)	Vapour phase soldering	1) SBC 2) 3) Assembly of SMDs	DML-07-001 Solder paste	1) N 2)	1) 2)		
8 005	Soldering	1) 루미르(주) 2)	The manual soldering of high-reliability electrical connections	1) SBC 2) 3) Assembly of EEEparts, wires and connectors	DML-07-002 Solder Wire	1) N 2)	1) 2)		

1 001	Adhesive Bonding	1) 루미르(주) 2)	Adhesive bonding of EEE-Parts on PCBs / Screw locking	1) SBC 2) 3) Bonding	DML-10-001 EC2216 B/A	1) N 2)	1) 2)		
5 001	Cleaning	1) 루미르(주) 2)	Cleaning of PCB's	1) SBC 2) 3) Cleaning	PCB material	1) N 2)	1) 2)		
16 001	Unit Assembly	1) 루미르(주) 2)	Crimping of high-reliability electrical connections	1) SBC 2) 3) Board Assembly	DML-06-001~003 STS304	1) N 2)	1) 2)		
7 001	Crimping/Stripping/Wire Wrapping	1) 프로메이트(주) 2)	Crimping of high-reliability electrical connections	1) SBC 2) 3) harness manufacturing	harness	1) N 2)	1) 2)		
4 002	Coating	1) 루미르(주) 2)	Conformal coating with Humiseal- 1B31	1) SBC 2) 3) Coating of PCBs	DML-10-002 Humiseal-1B31	1) N 2)	1) 2)		
15 001	Marking	1) 루미르(주) 2)	Name-Plate, Self-Adhesive, Laser Printed	1) SBC 2) 3) Marking	DML-17-001 THT-24-423-1 / R6002	1) N 2)	1) 2)		