

# BIP Application Checklist for Robotics & Automation (R&A) Systems

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## **Introduction:**

***To facilitate BIP evaluation, all applications shall include the drawings, detailing, test reports, certificates, relevant approvals from overseas authorities, and other documentation of the proposed system covering sections (A) to (F) described below.***

### **(A) General**

1. To provide method statements for safe and correct use of the robot to achieve good construction quality.
2. Does the robot collect personal data? If so, is there any Data Protection measures set in place?
3. If the system is equipped with camera or remote viewing device, please elaborate how to protect the privacy of public/residents when it is working in the built environment (e.g. when working on the building envelope).
4. The operation of robots shall comply with the PUB's requirements for discharge of trade effluent into the public sewers.
5. For batteries used in the robots, please include the safety compliance certificates where applicable from manufacturers.
6. For wireless modules, remote controls and other off-the-shelf communication devices, please include the IMDA compliances certificates where applicable from manufacturers.

### **(B) Overall Robots Details (BCA)**

1. Overview of the proposed system:
  - a. Brief description of the functional purposes of the robots;
  - b. Describe the benefits (and any limitation) of using this robot;
  - c. Describe the operating system & maintenance regime of the robot;
  - d. Is the robot manned or unmanned? Please provide the degree of autonomy and supervision requirement if the robot is unmanned;
  - e. Diagram of robot showing the dimensions and weight;
  - f. Communications protocol specifications used by the robot.

*Note: for commercialized robots, please include manufacturer's information and product brochures (including operation manual)*

2. Estimated productivity improvement for the intended operation for BIP application (e.g. spray painting, crack detections).

*Note: please request the template from the BIP Secretariat*

3. Project track records of applicants (both local and international, if any).

### **(C) Transportation & Logistics (LTA)**

1. Proposed Transportation Plan -
  - a. Indicate route from factory to holding area/construction site and travel schedule;
  - b. State vehicle type, overall dimensions (width, rear overhang, length & height) and weight;
  - c. Refer to [LTA.PROMPT](#) for oversized vehicle movement (OVM) permit requirements.
2. To specify/show the trailer dimensions and the model to be used for transportation of robots

#### **(D) Risk Management (MOM)**

1. Submit an audit report with supporting documents from a MOM-recognised WSH Auditing Organisation on a document review of your risk assessments and safe work procedures related to the use of robotic automation in your clients' worksites, including but not limited to the following:
  - a. Robot(s) deployment plan within the worksite (including transportation route, work zones, demarcation, etc);
  - b. Safe operation of robots within the worksite (e.g. human-machine interface, safeguards, encroachment prevention, etc);
  - c. Robot(s) maintenances and lock-out tag-out (LOTO);
  - d. Risk management plan including emergency response (e.g. emergency stoppage, etc);
  - e. Compliance to applicable Singapore Standards (e.g. SS ISO 10218: Robots and robotic devices – Safety requirements for industrial robots, etc).

*Note: A bizSAFE audit report is not acceptable as it does not meet the requirements as stated in item 1*

2. Your audit action plan and all necessary supporting documents/ photographic records to address and close the auditor's findings and recommendations from item 1.
3. Certification of (minimum) bizSAFE Level 3.

#### **(E) Environmental (NEA)**

1. The system shall comply with the technical requirements and provisions stipulated in the following:
  - a. Code of Practice on Environmental Health
  - b. Singapore Standard SS 593: Code of Practice for Pollution Control
  - c. Environmental Public Health Act, Environmental Protection and Management Act, and their attendant regulations, including the Environmental Protection and Management (Control of Noise at Construction Sites) Regulations.
2. Please specify noise control measure to keep noise within NEA's specified levels, especially for night works

#### **(F) Planning (URA)**

1. Suitable factory/warehouse spaces should be secured for the purposes of storage and maintenance of the proposed building products/materials/systems when not in use, as they will not be allowed to take up TOL land
2. The proposed building products/materials/systems shall not affect the amenity or convenience of the surrounding developments.