



CPP 2024  
COMPACT ROBOTS

Digital Labs  
I+D+i

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## 0. BACKGROUND

Ceibal has vast experience in the acquisition and distribution of educational robotics kits in Uruguay. One of the educational programs is based on the use of compact robots (which do not require assembly) in the first stage of formal public education. With this line of work under development, the robotics strategy is intended to reach the youngest children and their teachers with effective incorporation in the classroom.

## 1. CALL AIM

The aim of this call is the acquisition of **compact robots for use in initial education, and in first and second year of primary school (5 to 8 years old)**.

The robots must be able to perform basic actions such as moving forward, performing rotations and complementary actions such as drawing, emitting sounds or lights. Robots must be compact, i.e.: **robots that need to be assembled for their basic use will not be accepted**. Notwithstanding the above, accessories such as programming cards, maps, boards or other products that are used as part of the set may be offered and must be quoted separately.

The robots must be “self-contained”, i.e.: have the capacity to be operated without the need for the use of other devices, applications or programming. Notwithstanding the above, they can expand their potential with the support of programming environments. It is also expected that students will be able to use the robot without the exclusive need for written instructions.

Bidders should submit offers for compact robots according to the requirements detailed herein.

## 2. REQUIREMENTS

Any offer that does not meet any of the mandatory requirements requested in the corresponding category of section 2.1 COMPACT ROBOTS MANDATORY REQUIREMENTS will be disregarded.

### 2.1. MANDATORY REQUIREMENTS FOR COMPACT ROBOTS

#### 2.1.1 Structure

##### **2.1.1.1 Security**

The robot's electronics must be protected by enclosures that prevent users from accessing the circuitry. In addition, the moving parts of the robot such as wheels or arms must be designed in such a way that they cannot harm the user regardless of whether the robot is being used in an inappropriate manner.

##### **2.1.1.2 Parts with a measurement greater than 2 cm in any of its dimensions.**

The independent parts of the robot must have at least 2 cm in some of its dimensions.

### **2.1.1.3 Drop resistance of at least one meter**

The robot and all its accessories and components must withstand falls from a height of at least one meter onto a rigid floor without breaking. The validation will be performed in our laboratories using a standard Drop test machine.

### **2.1.1.4 Protection against splashing liquids**

The robot and all its accessories and components must withstand liquid splashes.

## **2.1.2 Functionalities**

### **2.1.2.1 Physical programming interface using buttons**

The robot must be programmed by buttons built into the robot without the mediation of any digital interface or additional parts.

### **2.1.2.2 Possibility to visualize the programming**

The programming must be able to be visualized by the users after it has been loaded to the robot. This can be by means of programming tokens that are held in position following the programmed sequence, lights that refer to the sequence of programmed instructions or similar.

### **2.1.2.3 Ability to program at least 16 instructions**

The robot must be able to follow a programmed sequence of at least 16 instructions.

### **2.1.2.4 Ability to translate orthogonally**

The robot must have the ability to translate forward, rotate 90° (ninety degrees) to the right and rotate 90° (ninety degrees) to the left according to its programming.

### **2.1.2.5 Correct precision in movements and turns**

The robot must have the ability to start its movement from a point A, move along the square path of 10cm side and return to point A with a deviation less than or equal to 10 mm and 10° degrees of rotation.

### **2.1.2.6 Ability to move over different surfaces**

The robot must have sufficient traction to be able to move over a smooth tile, wood or carpet floor (raised floor) and not be significantly impeded or deflected by joints.

### **2.1.2.7 Rechargeable battery**

The robot and accessories requiring power for operation must have a built-in rechargeable battery which must be fully recharged in a maximum of two hours with a USB port providing 500 mA of current.

### **2.1.2.8 Micro USB or USB Type C Charger**

The robot and accessories containing a battery must be able to be recharged using standard USB Type A to USB micro or USB Type A to USB Type C cables, taking into account that the USB Type A connector is where the power supply will be connected.

### **2.1.3 Other mandatory requirements**

#### **2.1.3.1 Minimum warranty period of 1 year**

The supplier is required to guarantee coverage for damages and failures for a minimum period of one year from the date of arrival at the port or airport of Montevideo.

#### **2.1.3.2 EN-71, NM300 or ASTM F963 certification.**

The product must have one of the following safety certifications that enable products considered toys to be imported into Uruguay<sup>1</sup>:

- EN 71-1:2014+A1:2018 of the European standard.
- NM300
- ASTM F963

## **2.2 DESIRABLE REQUIREMENTS FOR COMPACT ROBOTS**

### **2.2.1 Structure**

#### **2.2.1.1 Dust and water protection with IP53 or higher rating**

It will be considered that the robot electronics be protected by enclosures that represent a protection level of IP53 or higher.

#### **2.2.1.2 Components printable with laser or 3D printer**

It will be considered that the components or parts with which the robot interacts (mats, colored squares, programming chips, snap-on parts) can be printed with color printers or 3D printers and thus maintain the functionality of interaction with the robot. In this case, the parts should not contain electronics inside such as NFC chips or circuits with contacts.

### **2.2.2 Functionalities**

#### **2.2.2.1 Ability to rotate at specific angles**

It will be valued that the robot has the ability to rotate at angles defined by the programming. These angles must be pre-established and relevant for working with geometric figures. To meet this requirement the robot must be able to be programmed to rotate at least 3 specific angles (e.g. 30°, 45°, 60° or other).

#### **2.2.2.2 Spanish Voice**

If the robot emits words, it will be considered that they can be configured in Spanish.

#### **2.2.2.3 Ability to emit sounds in different tones**

The robot or its accessories must have the capacity to generate sounds with different tones in response to the interactions with the user. These sounds can be pre-established in the product and it is not required the user's capacity to generate them through programming.

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<sup>1</sup> <https://www.gub.uy/tramites/importacion-comercializacion-juguetes>

#### **2.2.2.4 Ability to program sounds in different tones**

It will be valued that the robot has the capacity to emit sounds through its speaker in time periods and/or tones defined by the user through programming.

#### **2.2.2.5 Ability to program short melodies**

The robot shall be expected to have the ability to emit musical notes through its speaker. The robot is expected to be able to emit at least 6 consecutive notes, the same being defined by the user through programming.

#### **2.2.2.6 Ability to record and play back sounds**

The robot shall be expected to have the ability to record sounds of at least 3 seconds through a built-in microphone. It is expected that these sounds can be played back by the robot using a built-in speaker. Playback should be on demand by the user using a command within the programming.

#### **2.2.2.7 Incorporation and/or programming of lights**

It shall be appreciated that the robot or its accessories have the ability to emit lights in response to interactions with the user. The lights and their interactions may be preset in the product or controlled by the user through programming (e.g., in defined time durations and/or colors).

#### **2.2.2.8 Ability to program loops**

The robot's programming environment shall be considered to be capable of programming loops.

#### **2.2.2.9 Programming by mobile application**

It will be assessed that the robot has the ability to be programmed through a software application that uses a graphical block programming interface compatible with tablets with Android 11 or higher operating system.

#### **2.2.2.10 WiFi or Bluetooth communication**

It will be assessed that the programming performed on the digital interface is sent to the robot via Bluetooth or WiFi. This requirement will not be considered fulfilled if the programming is sent to the robot via cable.

### **2.2.3 Other desirable Requirements**

#### **2.2.3.1 Potential for expansion**

It will be valued that the set has extensions or additional elements (cards, mats, drawing set) to support the use and learning experience.

#### **2.2.3.2 Pedagogical Material**

The set will be evaluated if it has pedagogical material, active community, or additional support tools that enhance the use and learning experience and is available in Spanish.

### 2.2.3.3 Accessibility

The robots and their accessories will be evaluated to ensure that they can be used by people with learning difficulties, autism spectrum (hyperacusis, sensory processing disorder), or physical disabilities (visual, motor, hearing).

## 3. OFFER

The offer must be submitted according to the specifications detailed in this section. Centro Ceibal reserves the right to reject an offer that does not comply with these specifications.

The offer shall indicate compliance with the requirements requested in Section 2 using the table in Annex I.

In addition, the following must be submitted with the offer:

- sample of the **compact robots** offered for testing and performance evaluation (1 per model), as detailed in 3.1.
- The **technical documentation** containing the detailed in 3.2.

### 3.1 Sample of the compact robot and its accessories

- An identical sample of the product offered must be submitted with the offer. In addition, its accessories must be included with the same characteristics and in the same quantities that will be included in case the product is awarded.

Samples shall be delivered at the reception desk at the offices of Centro Ceibal (Av. Italia 6201 Edificio Los Ceibos, Monday through Friday from 9 to 17hs), reference shall be made to the Offer, and Ceibal shall deliver a receipt to be signed by Ceibal and by the person delivering the samples.

In exceptional cases and when there are justified reasons in Ceibal's judgment, the bidder may defer the delivery of samples for a reasonable period of time that Ceibal will evaluate.

- The necessary tests will be performed to evaluate compliance with the requirements requested in section 2. In addition, Ceibal reserves the right to perform additional tests.
- Some tests to be performed on the samples may cause damage or alterations to the samples, so they may be returned in different conditions than those in which they were delivered. The bidder will have 4 weeks from the award date to withdraw the samples. Upon expiration of the aforementioned term without having withdrawn them, Centro Ceibal may freely dispose of them, without the right to claim by the bidder.

### 3.2 Technical documentation to be submitted

The following information must be specified and may be accompanied by brochures and additional material (manuals and/or guides).

- Contents of the box
- Estimated battery life
- Warranty (minimum 1 year) as indicated in point 5.

### 3.3 Economic offer

The offer must specify the unit CIF Montevideo (maritime) and/or CIP Mvd (air) quotation for each product offered where the delivery time for each item must be specified according to each range in case of variation. This type of quotation is mandatory. It is also possible to quote additionally for “bundles” or sets composed of more than one robot, in this case specify how many robots the set is composed of and what items it includes.

<b>Compact robots for Initial Education, first and second year of primary school (5 to 8 years old).</b>				
<b>Ranges</b>	<b>1-250</b>	<b>251-500</b>	<b>501-1.000</b>	<b>over 1.000</b>
Price per unit in USD CIF MVD sea				
Bundle price in USD CIF MVD sea				
Precio por unidad en USD CIP MVD air				
Bundle price in USD CIP MVD air				
Optional 1*				
Optional 2*				

\* *Items are optional for quotation*

Optionally, the offer may include separately to the cost of the required product (compact robot) the quotation of additional items, accessories or optional items. Failure to do so will be considered included in the price of the product offered.

- *Accessory kits or “add ons” offered.*
- *Spare parts such as: batteries, physical programming parts, etc.*

The quotation of optional items does not obligate Ceibal to purchase them.



Quotations shall be submitted by completing the QUOTATION TABLE in APPENDIX I. The bidder may add rows or columns to adapt the table to the particular offer, for example, according to the number of models offered.

#### 4. EVALUATION OF COMPACT ROBOTS

The offers will be evaluated according to compliance with the mandatory and desirable requirements, as well as the analysis of all technical documentation submitted, background information, warranty conditions, delivery terms, and the analysis of samples. Notwithstanding the above, Ceibal may also request demos during the evaluation stage.

The evaluation of samples will seek to assess the suitability of the compact robots to the operating environment to which they will be exposed and to the work dynamics to be achieved in the educational centers according to the following criteria:

- Review of the packaging, presentation and contents of the kit.
- Review of the compact robot
  - Drift testing: The robot is expected to maintain a straight motion without unwanted drift and to have return accuracy, which can be affected by drift.
  - Ruggedness: The robot does not disassemble easily and the materials are of good quality and robust. If there are buttons, it should be contemplated that the force required to actuate the button is possible for the target audience to exert.
  - Safety: Design with non-toxic materials, rounded edges and no small parts.
  - Usability: user-friendly, intuitive and easily appropriated by users. Presents clarity as to how the robot is programmed. Either through tabs/cards or buttons.
  - Adaptability: Possibility of navigating on different surfaces. In case it includes mats, it is appreciable that it can move over different surfaces or cards (if it brings).
  - Autonomy: Evaluate the duration of a battery charge: it should be usable for the time corresponding to a class (with periods of discussion, programming and testing).
- Review of physical or virtual literature contained in the kit, if applicable.
- Review of applications or programming software, if necessary.
- Pedagogical use/applicability: possibilities of being incorporated in the pedagogical proposal for the development of Computational Thinking.
- Adequacy of target audience (students between 5 and 8 years old).
- Additional products and/or services, accessories, add-ons.

Aspects to evaluate	Weight
Technical offer	60%
Price	40%

Mandatory requirements will be evaluated on a binary basis (complies/does not comply) while desirable requirements and samples (Technical Offer) will be evaluated on a scale of 0% to 100% with a weighting of low, medium or high as appropriate.

## 5. WARRANTY

The bidder shall include in its proposal the conditions, procedures and time limits for making warranty claims.

The bidder shall guarantee that the products supplied under the contract are new, complete, unused and free from defects attributable to design, materials, workmanship, storage conditions (proper packaging, temperature and humidity), shipment or any act or omission of the bidder that may arise from normal use of the products under the conditions prevailing in the country.

The warranty period of the product must be informed by the bidder, being the minimum warranty period of 1 year. In case the warranty period is not specified, Centro Ceibal will consider a warranty period of at least one year.

## 6. DELIVERY TERMS AND CONDITIONS

The bidder shall specify the delivery term of the products, to be complied with as from the award notification, being desirable the total delivery of the CIF Montevideo lot before 20.12.2024.

## **7. ANNEX**

### **7.1 - COMPLIANCE TABLE OF COMPACT ROBOTS**

The bidder must complete the compliance table for all the requirements requested. For the evaluation team's reference, the bidder shall also indicate where in the offer submitted the information corresponding to the requirement is located in the Remarks field.

The COMPLIANCE column for mandatory requirements shall be completed with Yes/No options. In the case of desirable requirements, it may be completed with the options Yes/No/Partial. In the case of partial compliance, the information in the OBSERVATIONS column should be expanded.