

# Artimo Studio Site Requirements

A Ross Robotics system consists of control room equipment and studio equipment.

This document specifies site requirements for Artimo studio equipment. It includes the following sections:

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**Ask Us Anything** — Ross Video is pleased to provide guidance and answer any questions you might have about planning your installation. Our friendly, experienced Program Managers can help you achieve an efficient and trouble-free installation.

**IMPORTANT:** Ross Robotics always strives to provide excellent customer service. Installation of equipment provided by Ross Robotics must be performed by Ross-qualified personnel only. If any unqualified persons unpack and/or attempt to install equipment provided by Ross Robotics, the warranty is voided, and any actions required to correct the installation and/or repair the equipment will be at the expense of the customer and/or systems integrator.

## About Ross Robotics Systems

Robots in the studio are controlled from the control room through a computer application named SmartShell and the CX Panel. The SmartShell computer communicates with robots and other components over a dedicated Ethernet network. Some systems include multiple operator positions, each with its own SmartShell computer and CX Panel.

The system can also control selected third-party robots. For more information, contact Ross Video.

## Artimo System Package

The Artimo System is as follows:

- **RRB-ART-XY50** — Artimo free-roaming robotic system with a U-frame telescoping lift and an advanced suspension system. The lift stroke is 130cm (52”). The maximum payload is 40kg (88 lbs).  
**Note:** The payload includes all customer-installed hardware, cables, and power supplies.  
It is not limited to components attached to the camera cradle, and includes any additional equipment integrated into the system.

## Artimo Accessories

The Artimo product line features a wide range of optional accessories, including the following:

- **Spare Parts Kits** — You can order spare parts kits to have readily available in case quick repairs are required.
- **CueScript™ Prompters** — Ross Video sells CueScript™ teleprompters that are fully compatible with our robots.
- **CueScript™ Talent Monitor** — Ross Video sells CueScript™ talent monitors that are fully compatible with our robots.

**Note:** The preceding list does not include all available accessories, and Ross Video continues to develop new ones. Contact us for details about our latest innovations.

## Payload Design

It is important to plan exactly what components will be installed on the robot(s), and how they will be secured. For best results, refer to the following table.

Payload Criteria	Details
<b>Maximum payload</b>	<ul style="list-style-type: none"> <li>• The maximum payload is 40 kg (88 lbs), including the camera, lenses, teleprompters, and talent monitors.</li> </ul>
<b>Light payload</b>	<ul style="list-style-type: none"> <li>• The payload is as light as possible.</li> <li>• Lighter payloads result in smoother movement, especially when using a dolly. When determining the weight of the payload, remember to account for the weight of all cables that run to the head.</li> </ul>
<b>Compact and centered payload</b>	<ul style="list-style-type: none"> <li>• The payload is as compact as possible and its weight is concentrated near its center.</li> <li>• The payload must be balanced in two axes: front to back along the camera cradle, and vertically around the tilt axis.</li> </ul>
<b>Lightweight prompter and talent monitor</b>	<ul style="list-style-type: none"> <li>• The prompter and talent monitor are light and small, and must:               <ul style="list-style-type: none"> <li>• provide a recommended diagonal viewing area of at least 17 inches.</li> <li>• be mounted rigidly to prevent unwanted movement of the robotic head.</li> <li>• have no loose or free-moving parts.</li> </ul> </li> </ul>
<b>Balanced robot</b>	<ul style="list-style-type: none"> <li>• The entire robot must be balanced around its pan axis after all components and the payload are installed.</li> <li>• Failure to do so will cause the robot to lean during panning movements.</li> </ul>

## General Studio Requirements

This table outlines the key general requirements for the optimal operation and maintenance of the Artimo system in a studio environment:

General Studio Requirement	Details
<b>Clear and Unobstructed Operating Area for lidar</b>	<ul style="list-style-type: none"> <li>• Artimo's lidar localization system requires an environment with fixed landmarks to ensure that shots are recalled accurately. In a typical studio, these landmarks will consist of studio features, such as walls or other set pieces that do not change. Temporary or moving set pieces can be excluded so that they do not affect accuracy, but must not block the lidar's visibility of fixed landmarks.</li> <li>• Studio features that are suitable for use as fixed landmarks, must meet certain criteria:               <ul style="list-style-type: none"> <li>• <b>A vertical edge at lidar height (35 cm)</b> Edges that are curved (for example, green screen walls), sloped, or have cut-outs or protrusions at lidar height may impact accuracy.</li> <li>• <b>A stable, fixed position</b> Edges that move, such as curtains or sliding/rotating set pieces, can interfere with the localization system.</li> <li>• <b>A non-reflective, opaque surface</b> Highly reflective surfaces, or surfaces that are transparent to lidar, such as shiny metal, glass, or mirrors, are not suitable as landmarks. Curved LED/LCD walls may also affect lidar performance.</li> <li>• <b>A minimum size of 1 m × 1 m, ideally with two edges at right angles</b> Multiple landmarks placed at different angles to the robot also fulfill this requirement.</li> <li>• <b>A non-symmetrical placement</b> Identical landmark patterns appearing in multiple directions can create ambiguity in localization, so symmetric layouts should be avoided.</li> </ul> </li> <li>• Where a studio has features that are not suitable for use with lidar, they can be excluded from consideration. To maintain accuracy, it is essential that Artimo always has visibility of at least 3 fixed landmarks. In certain cases, such as a green screen studio, it may be necessary to add additional landmark objects to the studio to fulfill these criteria.</li> <li>• During commissioning, a studio map must be created. When this occurs, it is important that the studio is:               <ul style="list-style-type: none"> <li>• <b>A final studio layout</b> The space must be representative of its final form, with fixed landmarks such as walls and set pieces already in place.</li> <li>• <b>A clear and unobstructed environment</b> All temporary objects and all personnel must be removed to ensure accurate mapping.</li> </ul> </li> </ul>
<b>Rigid Camera, Prompter, and Accessory Mounts</b>	<ul style="list-style-type: none"> <li>• Ensure all mounts, straps, support, bracketry, and connecting hardware are rigid.</li> <li>• A loosely mounted or poorly designed rig reduces the ability to control the camera position by introducing flexibility and resonance into the system.</li> </ul>
<b>Optimized Preload Suspension</b>	<ul style="list-style-type: none"> <li>• Adjust the preload of the suspension to perfectly match the payload.</li> <li>• Proper adjustment optimizes the performance of the suspension, ensuring smooth and stable movements by balancing the constraints from top to bottom.</li> </ul>
<b>Properly Balanced Payload</b>	<ul style="list-style-type: none"> <li>• A properly balanced payload is essential to achieving smooth on-air shots for all types of moves, including robotic system movements.</li> <li>• An improperly balanced payload can also cause accelerated wear and tear on the system.</li> </ul>
<b>Robotics Equipment Installation Environment</b>	<ul style="list-style-type: none"> <li>• Equipment must be installed in an indoor location not exposed to moisture.</li> <li>• Acceptable air temperature range is 5°C to 40°C (41°F to 104°F).</li> <li>• Acceptable air humidity range is 0% to 90% RH, non-condensing.</li> <li>• Free of ramps and sudden changes in floor height. The system can accommodate floor height variations up to 10 mm.</li> </ul>



**General Studio Requirement**

**Details**

**Important Notice:** Ross Video does not provide Ethernet cables, power supply cables, sync reference cables, or video cables. Such cables are selected or custom-made to suit the facility, and are to be provided by the systems integrator or the customer.



## Studio Floor Requirements

The studio floor's condition is critical to achieve fluid, stable on-air trucking shots. Because the robotic system is riding directly across the floor, any irregularities in the floor are likely to travel up to the camera and appear in the image as camera shake.

Studio Floor Requirement	Details
<b>Minimize Floor Roughness</b>	<ul style="list-style-type: none"> <li>Short scale bumps, seams, or discontinuities in the floor cause the base of the robotic system to bounce sharply up and down as it travels over them.</li> </ul> <p>Some examples of floor roughness include:</p> <ul style="list-style-type: none"> <li>Lips at the seams between tiles, where the edge of one tile is higher than that of the neighboring tile</li> <li>Seams or cracks in concrete floors</li> <li>Texture in a floor tile or on the surface of dried paint drips</li> <li>Position marks using tape on the floor</li> </ul>
<b>Compliance or Hardness of Flooring Material</b>	<ul style="list-style-type: none"> <li>Vinyl flooring is available in tiles or in large rolls for covering larger areas. These are attractive to set designers due to the flexibility they offer in creating different looks or patterns in the floor.</li> <li>Unfortunately, depending on the relative softness of the material, they can compress under the weight of the robotic system when it is left in place for even an hour or two. This can leave impressions in the floor where the wheels were sitting, which can then cause vibrations in the camera's image if a robotic system crosses over them. <b>Note:</b> In most cases, these indentations are temporary and over time will disappear.</li> </ul>
<b>Uniformity of Floor Flatness</b>	<ul style="list-style-type: none"> <li>Unevenness in the floor's surface that varies on the scale of a meter or less.</li> </ul> <p>Examples of this include:</p> <ul style="list-style-type: none"> <li>A hand-troweled, lightly polished concrete floor.</li> <li>A tile floor that has been laid on an uneven subfloor, or with poorly controlled adhesive.</li> </ul> <ul style="list-style-type: none"> <li>In this case, the determining factor will be the worst-case local gradient across the floor. As the robotic system rolls over the uneven floor surface, not only does each wheel travel up and down, but they are doing so asynchronously (assuming a random unevenness across the floor). As one wheel goes up, the opposite wheel may be going down, and vice versa. As a result, the camera could be moving up and down, as well as swaying side to side. As the maximum height of the robotic system is more than double the wheelbase of the robotic system (i.e. the separation between the two drive wheels), any unevenness between the wheels will be amplified by the time it reaches the camera.</li> <li>How noticeable this movement is will depend on the speed at which the robotic system is traveling and the height of the camera.</li> </ul>
<b>Rigidity of Floor and Subfloor</b>	<ul style="list-style-type: none"> <li>Any flex in the floor as the robot travels across it will result in a noteworthy unevenness. This generally only happens when the studio floor is raised, and either the top surface or the underlying support structure is flexing under the weight of the robot.</li> </ul>
<b>Maintain Floor Cleanliness</b>	<ul style="list-style-type: none"> <li>Any dirt, debris, even dust, can create problems with camera stability in the following ways: <ul style="list-style-type: none"> <li>The accumulation of dirt or dust on the wheels of the robotic system will cause bumps or wobbles in the motion of the robot.</li> <li>Debris on the floor or stuck to the wheels will cause a sudden bump up and down as it passes under the robot.</li> </ul> </li> </ul>

Studio Floor Requirement	Details
<p><b>Preparing the Studio Floor</b></p>	<ul style="list-style-type: none"> <li>• To produce smooth, wobble and vibration-free moving shots.</li> </ul> <p>Ensure the following approaches when preparing the studio floor:</p> <ol style="list-style-type: none"> <li>1. A smooth, polished concrete floor without seams. Any cracks should be filled prior to polishing.</li> <li>2. If the floor is concrete but not smooth enough, it should be covered with epoxy to obtain a smooth, flat and seamless surface.</li> <li>3. If the subfloor is a raised floor, then:               <ul style="list-style-type: none"> <li>• A solid flat base should first be formed by covering the subfloor with two layers of 3/4-inch plywood which should be glued and screwed together. Screw holes and joints should be filled and smoothed.</li> <li>• The plywood should be prepared by sanding and then sealing with a penetrating (solvent free) epoxy priming coat.</li> </ul> </li> </ol>
<p><b>Operational and Maintenance Practices</b></p>	<ul style="list-style-type: none"> <li>• To maintain optimal performance, it is important to adhere to the following operational and maintenance practices:               <ol style="list-style-type: none"> <li>1. The studio floor should be kept clean by regular scrubbing to avoid dirt and grease contacting the Artimo wheels.</li> <li>2. Avoid using spike or masking tape on the floor as this will cause noticeable bumps and vibrations in the camera movements, and potentially leave a residue on the floor and Artimo wheels.</li> <li>3. Regularly inspect and clean the Artimo wheels.</li> </ol> </li> </ul>

## Artimo Studio Requirements

The following table lists studio requirements for Artimo robots:

Studio Requirements	Details
Power Supply for Artimo	<ul style="list-style-type: none"> <li>• One AC power supply cable per robot, long enough to allow repositioning of the robotic system.</li> <li>• The robot end of the cable must terminate in a C13 female socket connector (IEC/EN 60320-1), which plugs into a C14 male plug connector at the base of the lift column.</li> <li>• Each robot is equipped with a universal power supply that accepts a voltage range from 90V to 264V AC, covering voltages from 100V to 230V AC.</li> <li>• Total power consumption per robot is 600 Watts (maximum), plus up to 480 Watts (maximum) for prompter and other accessories powered through an auxiliary power socket at the base of the lift column.</li> <li>• Ensure that all equipment plugged into the auxiliary power socket can accept the same AC voltage supplied to the robotic system.</li> </ul>
Ethernet Connection for Artimo	<ul style="list-style-type: none"> <li>• One stranded CAT5E Ethernet cable per robot, long enough to accommodate the full range of motion of the robotic system.</li> <li>• One end must plug into an Ethernet jack, and the other end must terminate in a male RJ45 connector at the head/lift column.</li> <li>• The maximum cable distance between the Artimo and the Ethernet network switch in the control room is 100 m (328'). This range can be increased using an Ethernet extender (not provided).</li> </ul>
Cables for Artimo	<ul style="list-style-type: none"> <li>• Camera and accessory cables as required, including power cables, video cables, etc. All cables must be long enough to accommodate the full range of robotic system movement.</li> <li>• A 2 m (6.5') cable management system is included wrap the bundle of cables that runs between the robotic system base in fixed chains and the free roaming head.</li> <li>• A 10 m (32') flexible sleeve (cable sock) is included to wrap the bundle of cables that runs across the studio floor to the robotic system's IO panel. Additional lengths can be ordered from Ross video.</li> <li>• One sync reference cable per robot, terminating in a standard male BNC plug which connects to a standard female BNC socket on the robotic system's connection panel. This is required only for AR/VS (Augmented Reality and/or Virtual Set) applications.</li> <li>• AR/VS applications require that the same sync reference signal be delivered to each robot, to each camera, and to the AR/VS graphics rendering system.</li> </ul>
Power Supply Circuit Protection	<ul style="list-style-type: none"> <li>• Each power supply circuit must be protected by a 15A fuse or circuit breaker (for 120V AC circuits), or an 8A fuse or circuit breaker (for 240V AC circuits).</li> </ul>
<p><b>Important Notice:</b> All cables that run to a robot or to a robotic head/lift column must contain stranded conductors only. Solid conductors are not acceptable because they are more likely to deteriorate due to robotic movement, causing intermittent data transmission. It is also important to use very light, flexible cables to reduce drag.</p>	