

GUNDAM GLOBAL CHALLENGE

Real Entertainment Project Proposal

“Externally Powered, Light-Weight GUNDAM Independent Walking System”



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Outline

“Externally Powered, Light-Weight GUNDAM Independent Walking System”

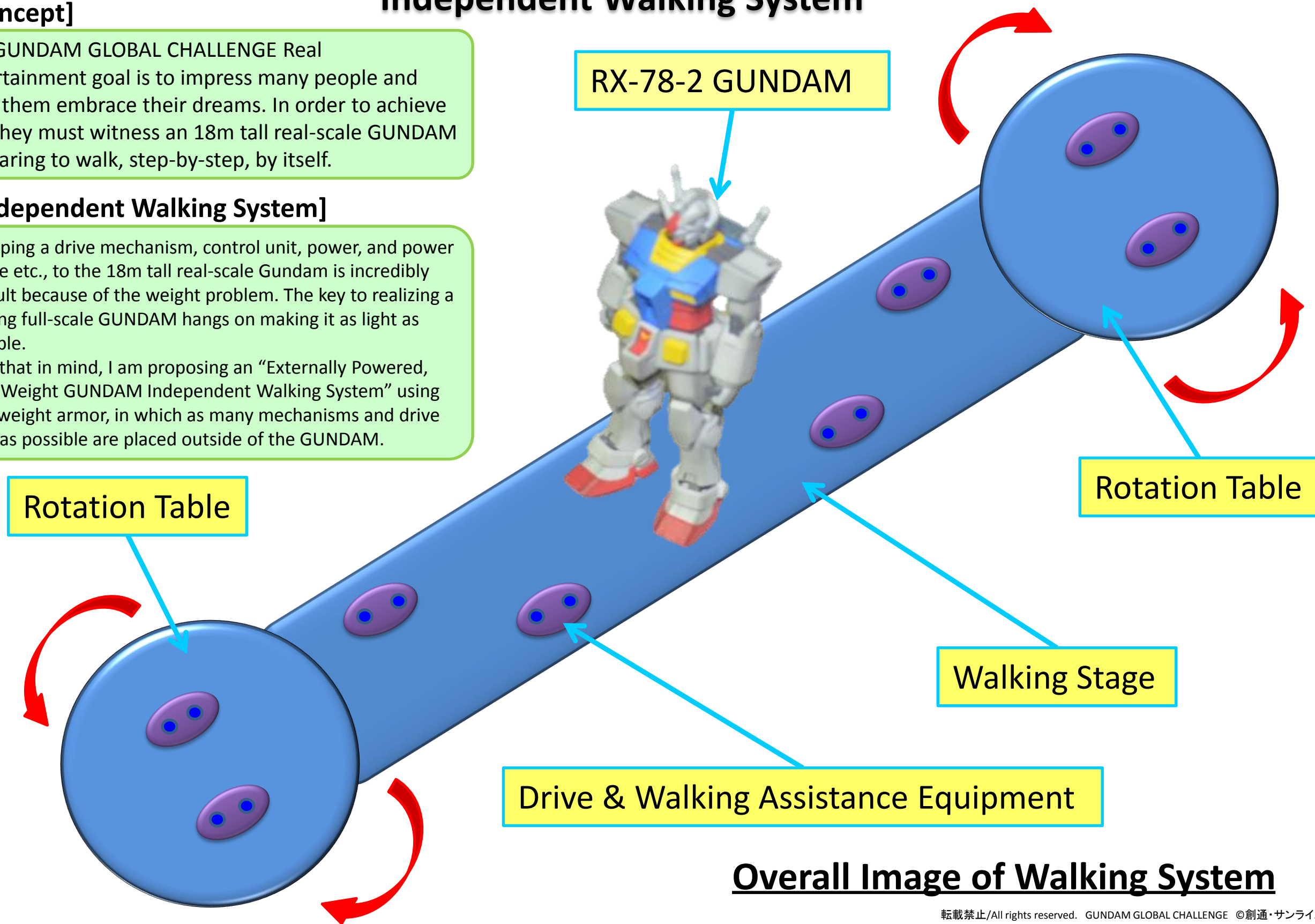
[Concept]

The GUNDAM GLOBAL CHALLENGE Real Entertainment goal is to impress many people and have them embrace their dreams. In order to achieve this they must witness an 18m tall real-scale GUNDAM appearing to walk, step-by-step, by itself.

[Independent Walking System]

Equipping a drive mechanism, control unit, power, and power source etc., to the 18m tall real-scale Gundam is incredibly difficult because of the weight problem. The key to realizing a walking full-scale GUNDAM hangs on making it as light as possible.

With that in mind, I am proposing an “Externally Powered, Light-Weight GUNDAM Independent Walking System” using light-weight armor, in which as many mechanisms and drive units as possible are placed outside of the GUNDAM.



Overall Image of Walking System

Table of Contents

- 1. Front Cover**
- 2. Outline**
- 3. Table of Contents**
- 4. Externally Powered, Light-Weight GUNDAM
Independent Walking System**
- 5. Walk Cycle**
- 6. About the Safety Mechanisms**
- 7. Light-Weight Armor (Materials)**
- 8. GUNDAM Body Configuration**
- 9. Actions for the Audience**
- 10. Development Schedule**

Externally Powered, Light-Weight GUNDAM Independent Walking System

1. [About the Walking System]

Moving an 18m full-scale GUNDAM with drive mechanisms & motors etc., built-in in the present day is fraught with issues that must be solved. Therefore, if we do our best to limit the parts installed internally and provide assisted movement from external sources, together with simplification and weight reductions of the GUNDAM body, making walking a reality becomes possible.

Rotation Table

For a walking, a full-scale GUNDAM, changing direction is no simple task. Having the GUNDAM turn itself would increase the machinery and lead to both a mechanical and weight burden. While it would be possible to create a circular stage, the cost of installation would increase. Therefore, taking into account the certainty and cost, I think the Rotation Table direction change system is a much better choice.

2. [Catapult-Assisted Walking]

Movement Direction

Catapult

GUNDAM Central Axis

GUNDAM Foot

Leg Outer Rotation Axis

GUNDAM Hips

The rotation of the catapult assists the GUNDAM's walking and largely supports the stepping motion.

RX-78-2 GUNDAM

Explanation about the GUNDAM's body follows below on P8.

Starting point
Rotation Table

Auxiliary Walking Equipment (1)

In order to support the auxiliary walking equipment I plan to simplify the machinery parts around the GUNDAM's back.

Power Supply Equipment

I plan to reduce the weight of the battery and drive machinery by locating the power source and hydraulics externally.

Auxiliary Walking Equipment (2)

The GUNDAM will be held in place by inserting a shaft into its leg. (See P6 for details)

Catapult power supply and assisted walk equipment.

Walking Stage

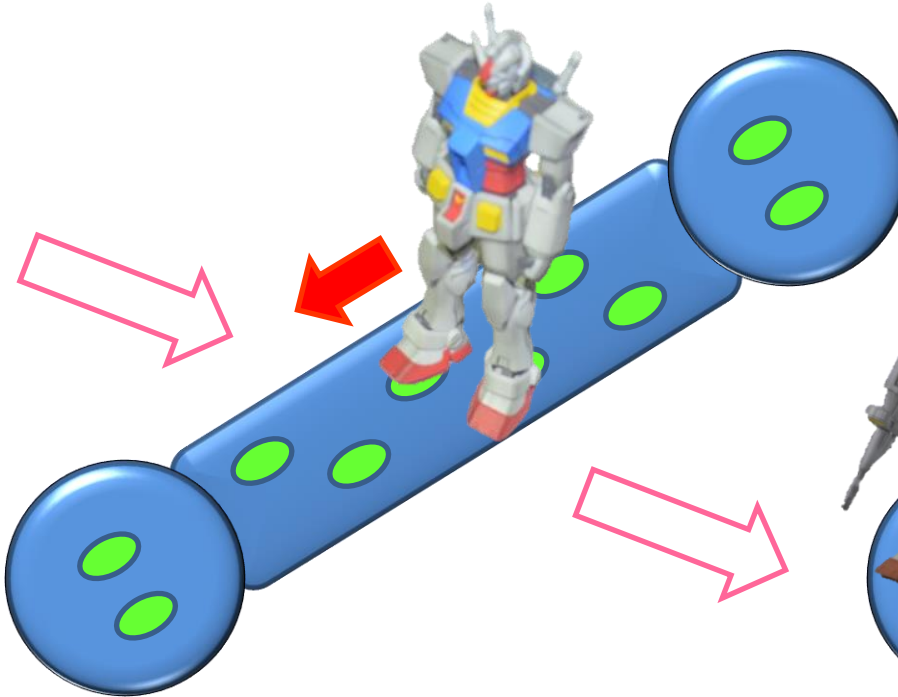
GUNDAM walkway with assisted walk support equipment installed.

Walk Cycle

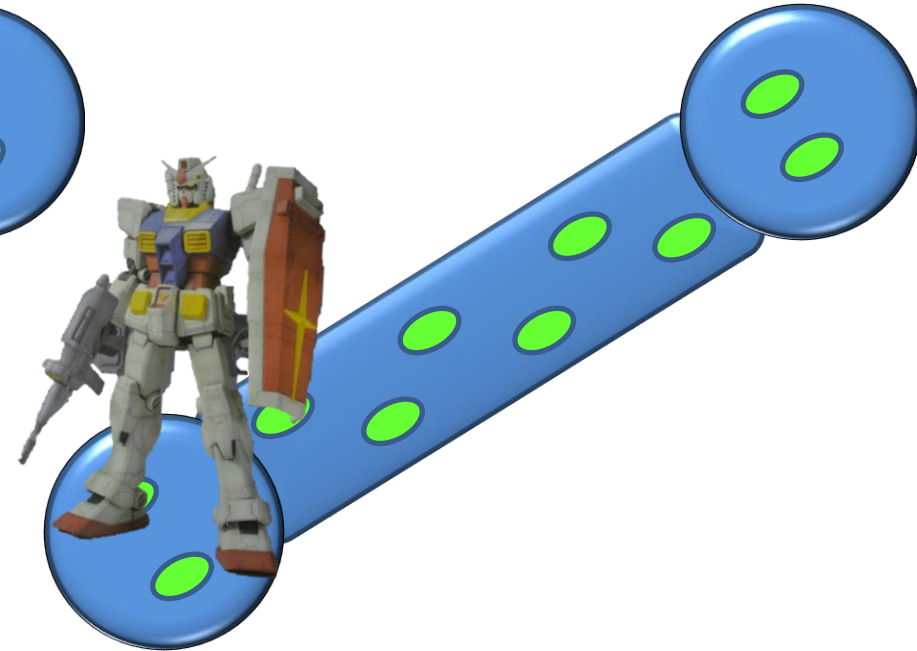
(1) Starting Point



(2) Walk



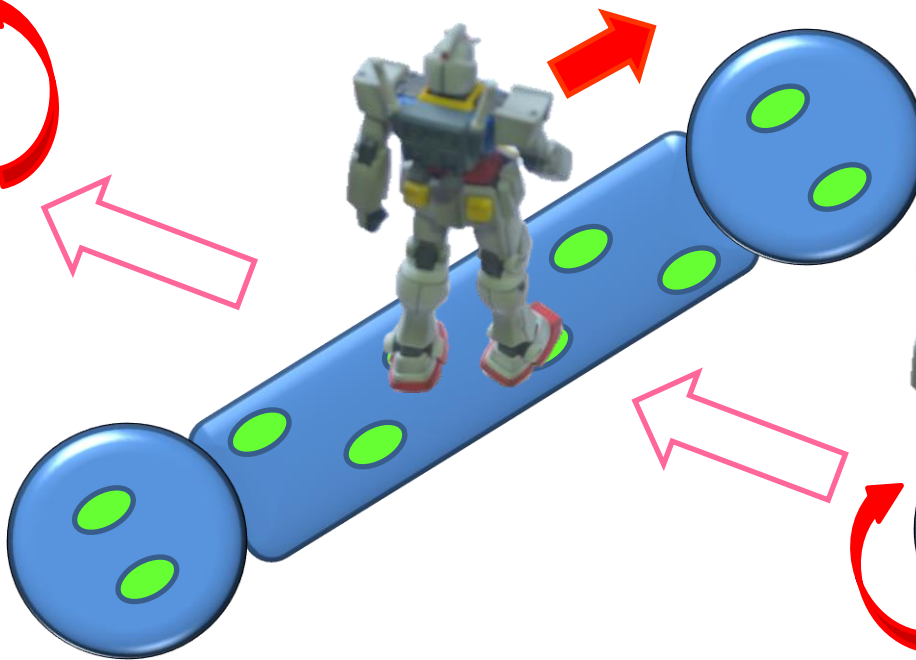
(3) Pause



(4) Change Direction



(5) Walk



(6) Pause to rotate
at start point
(1 cycle complete)



About the Safety Mechanisms

Safety equipment to prevent falling
during waiting

(1) Safety fence
surrounding the fall area

(2) Auto-winding &
connecting safety wire

Fixing wire
on GUNDAM

Fixing wire
on platform

Hook

(3) Safety wires along
the walkway

*** GUNDAM can be secured anywhere.**

Leg safety mechanism during walking

Shafts inside the
leg hold it in place

Shaft
Fixation
Equipment

Walkway Surface

Reception
Connector

A fixation shaft is
inserted into the
leg when the foot
touches down.

**Motor to
rotate the
leg**

Drive
(hydraulics) &
electricity

Catapult
Unit

Fixation shaft
insertion

Light-weight Armor (Materials)

[The importance of armor]

The key to making a walking full-scale GUNDAM a reality lies in producing light-weight armor.

[Materials for Armor]

Use a new material made from light-weight foam and carbon fiber.

[Armor parts weight]

Parts for production: ~100 pcs
Armor surface area: ~324m²
Gross Weight: ~600kg



Image of assembled GUNDAM

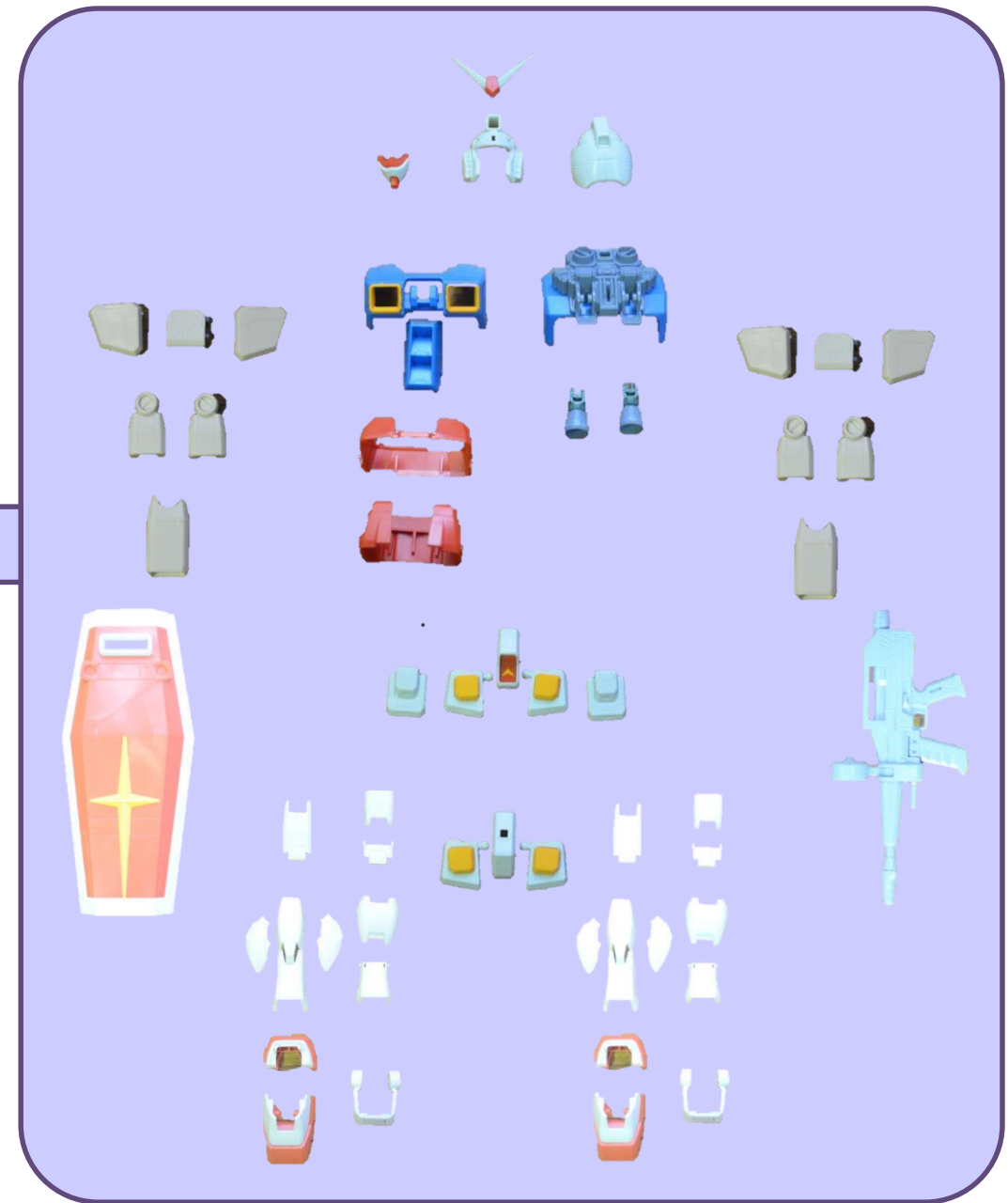


Image of the main armor parts

GUNDAM Body Configuration

[GUNDAM Weight]

Complete weight 7.1t
(Including armor and machinery)

[Weight breakdown]

- 1. Head : 0.1t
- 2. Arms : 0.5t × R/L
- 3. Torso : 2.0t
- 4. Legs : 2.0t × R/L

[GUNDAM Movable Parts]

The driving force actuators are hydraulic cylinders, hydraulic motor, and servo-motors etc., which move each axis.

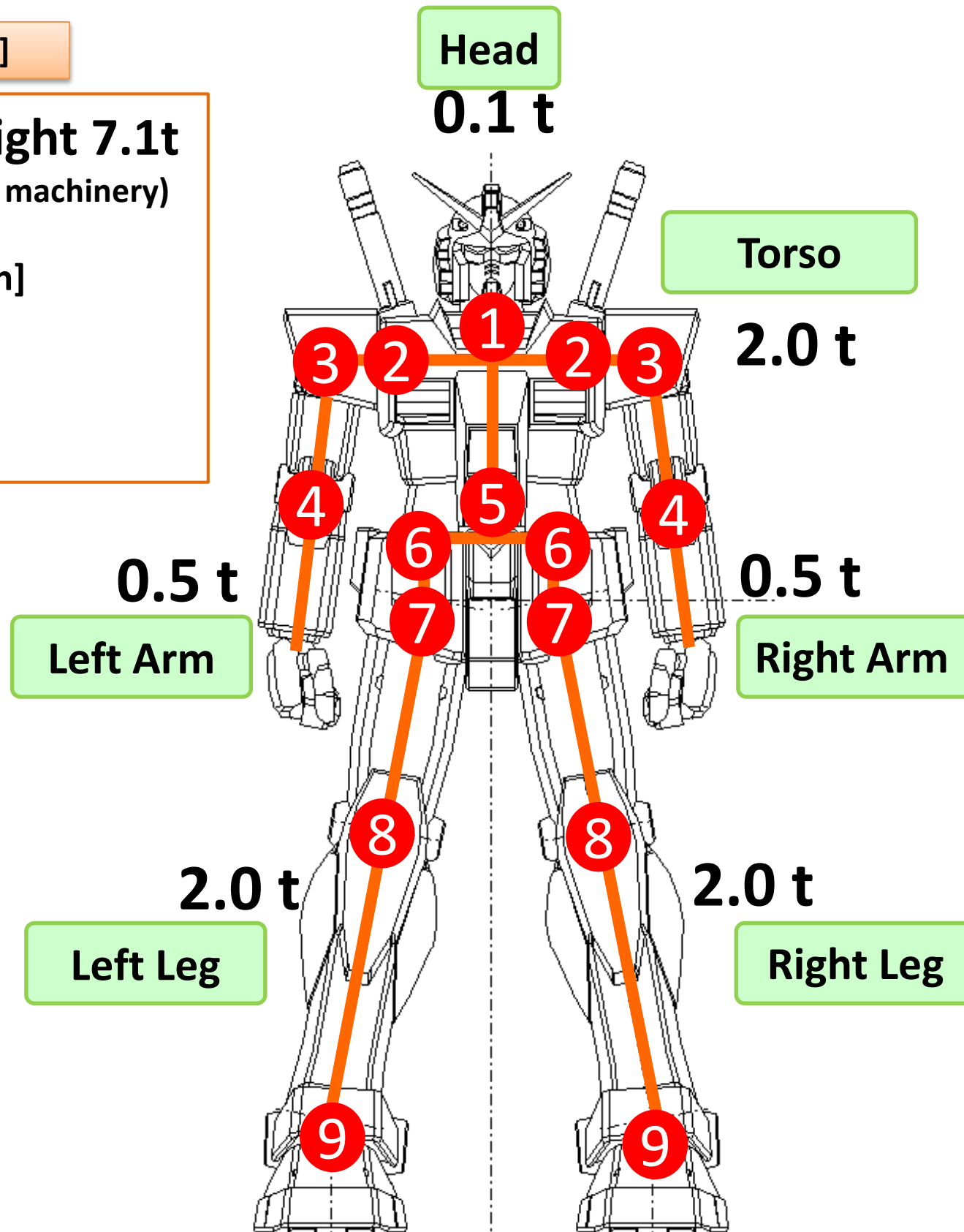
[Individual movement axis]

- 1. Axis : Move the head
- 2. Axis : Move arms up, down, back & forth
- 3. Axis : Move arms in, out, up & down
- 4. Axis : Move the elbow
- 5. Axis : Rotate lower back
- 6. Axis : Rotate legs in & out
- 7. Axis : Move thighs up & down
- 8. Axis : Bend the knees
- 9. Axis : Move ankle joints

[No. of joints per part]

Head : 1 joint
Torso : 1 joint
Arm (both) : 6 joints
Leg (both) : 8 joints

Total: 16



Actions for the Audience

Alongside the all-important “Independent Walking”, this plan has another way to wow the audience with its “Real Experience Function”.

1. [Actions programed into the GUNDAM]

Automated Actions

- (1) GUNDAM walking independently.
- (2) Viewing GUNDAM from 360° on the rotation table.
- (3) Re-enacting fight scenes with beam rifle or shield poses.
- (4) Sharing the joy of a victory pose with the audience.
- (5) Amplifying the sounds of the motors and cylinders for the above actions will give GUNDAM a real sense of presence.

2. [Real Experience operated by remote control]

1. Audience members themselves can make GUNDAM move with their smartphones.

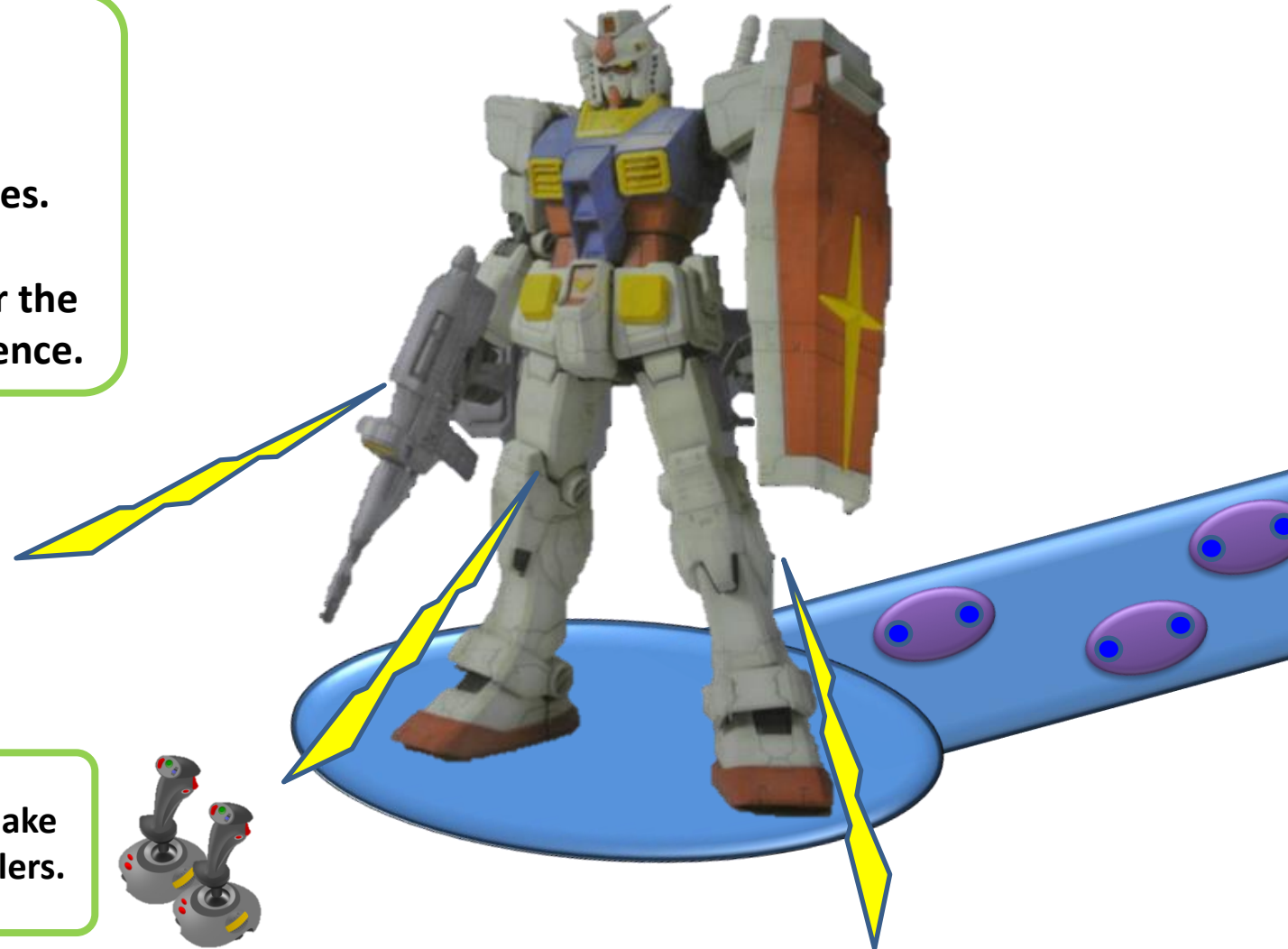


2. Audience members themselves can make GUNDAM move with specialized controllers.




















3. See through GUNDAM's eyes to increase the sense of unity. By using image compression techniques, the audience member can see clearly far and wide from GUNDAM's high vantage point on a screen or with goggles.

4. Feel what it's like to be a GUNDAM pilot by equipping a wearable suit, etc.



* Additionally, although there aren't yet any remote control large scale robots, we could accept this as a new challenge to contribute to and improve this dawning field of remote control technology.

Development Schedule

	Item	2016	2017	2018	2019
1	Chose a plan				
2	Finalize Details ①Create Concept Drawings ②GGC Members' Concept DR ③Create Assemble Drawings ④Drawing Approval ⑤Create Parts Drawings		    		
3	Manufacture ①Manufacture Parts ②Assemble Body ③Create Walking Stage (inc. Engineering) ④Arrange GUNDAM on the stage ⑤Adjustment ⑥Movement Confirmation ⑦Repeated Movement Test		  	   	
4	Correcting Defects ①Create Defect Drawing ②Create Parts Drawings ③Create Parts ④Assembly			   	
5	Final Adjustments ①Movement Confirmation ②Repeated Movement Test ③Completion				