We have built active learning classrooms that stimulate discussion, and lecture rooms where we have sought to produce comfortable sound in all corners of the room.

Ritsumeikan University Kinugasa Campus

Installed system: Sound and video systems for universities

Date of installation: March 2021
Location: Kansai area

Challenge:
To create a learning space that enhances learning effectiveness, in the process of renovating the lecture hall building

Solution:
Panasonic's sound and video solutions provide comfortable sound and video displays that can be easily seen from every corner of the classroom

"
I was shocked by this acoustic simulation software: it enables adjustment of the classroom acoustics, which had previously only been possible in special environments such as stadiums and concert halls.
"

Kengo Kurashina
Information Infrastructure Division
Information System Department
Ritsumeikan University
*Affiliation at time of delivery.

Background of System Installation

Renovating lecture halls to suit increasingly diverse learning methods

Ritsumeikan University's sprawling Kinugasa Campus houses roughly 35 buildings. In the past, each building has had partial renovations on its systems every few years or so, but in March 2021, Keimeikan, which is primarily used by the College of Letters, underwent a full renewal. It was a comprehensive, large-scale renewal that meets the needs of modern education methods, such as installing flexible classrooms that will accommodate not only traditional lectures but also active learning-style classes.

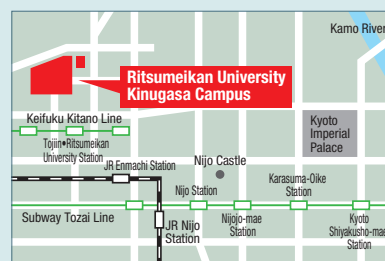## Reasons for System Installation

A total audio and video solution that can improve learning efficiency

What was required when it came time for renovations was a sound system that would convey sound to all corners of the classroom in an easily audible manner and a video system that would allow us to conduct classes that are effective and easy to observe. For the speakers, RAMSA speakers were selected for their ability to build a phase-aligned, uniform environment using acoustic simulation software. As for the microphones, they went with wireless microphone systems in the 1.9 GHz and 800 MHz bands, which are noted for their lightness and ease of use. For the video system, an LCD Laser Projector and LCD display, which have always been evaluated very highly, were adopted, and for classrooms where group discussion is required, the PressIT Wireless Presentation System, which allows materials to be projected with one click of a PC mouse, was introduced. The smooth screen-sharing contributes to active discussion.

Creating a world-class campus

Ritsumeikan University, aiming to create a world-class campus, has been working on a campus development plan for around 10 years, with the plan looking forward around 30 years in the future. The renewal of Kinugasa Campus's Keimeikan was a major renovation to follow the completion of Seishinkan in March 2020.

■ Location: 56-1 Tojiin Kitamachi, Kita-ku, Kyoto (Kinugasa Campus)
■ URL: http://www.ritsumei.ac.jp/

▲ Kinugasa Campus is located in Kyoto, the city of scholarship, culture, and the arts.

Effects Achieved by System Installation

Sound System

▲ A medium-sized classroom. A total of four RAMSA Near Field Speaker Series 16-cm 2-Way Speaker WS-NF055 units are installed on the front, rear, left, and right of the ceiling.

▲ RAMSA Near Field Speaker Series 16-cm 2-Way Speaker WS-NF055

▲ The RAMSA Near Field Speaker Series 10-cm 2-Way Speaker WS-NF015, a fold back speaker for the podium.

▲ RAMSA Near Field Speakers are installed as auxiliary speakers to cover the central area of the classroom. (Ceiling Embedded) WS-AC066

▲ The acoustic rack contains two RAMSA Digital Power Amp WP-DM912 units, which can automatically run the calculated values processed by PASD.

Building a uniform sound environment using PASD acoustic simulation software

A total of eight ceiling-mounted RAMSA Near Field Speaker Series units are installed in the 121-seat medium-sized classrooms. Two 16-cm 2-Way Speakers were placed in the front, and two in the rear. These ensure that the sound reaches the entirety of the large classroom. Two more Ceiling Embedded Speakers of the same series were installed to cover the central part of the classroom. For fold back speakers, two 10-cm 2-Way Speakers were installed on the podium. We talked to Kurashina from the Information System Department, who was in charge of the renovation of Keimeikan.

"We were initially thinking about speakers made by a different company, but then I was invited to a RAMSA listening session. I was incredibly surprised, upon hearing the Near Field Speakers, at how much sound could come out of such small speakers. I heard that this sound could be produced by tuning with RAMSA's own acoustic simulation software, PASD, and thought 'We really have to get this at Keimeikan.'"

PASD is free software for RAMSA that examines the position and angle of speakers based on three-dimensional CAD data of the space in question, and automatically generates FIR filters to allow tuning. Regarding PASD, Kurashina had this to say: "I was truly shocked that FIR filters, which sound engineers put a lot of effort into learning, could be generated automatically. Now it's possible to create a phase-matched uniform atmosphere, reproducing the level of a large concert hall or sports stadium within a classroom environment! The difference between before and after we actually applied the FIR filters is so incredible: it's like night and day. While line array speakers would have improved clarity, students listening for an entire class period of 90 minutes would likely suffer fatigue from listening to them, which we didn't want. I'm glad that we were able to create an environment where the sound can be heard from each seat throughout the room by suppressing reflected sound in a space with so many seats, without using line arrays. I feel like we've found one solution to the problem of how to produce comfortable sound."

The Wireless Microphone System's light weight and ease of use contribute to smoother classes

A number of wireless microphone systems have also been installed during this renovation. The 1.9 GHz band (DECT-compliant system) WX-SR200A Series was installed in Learning Studio, which is mainly for group discussions, with the 800 MHz band being used for the medium-sized classrooms.

"The DECT system doesn't require a channel plan and allows up to 16 microphones to be used on a single system, so we use it in classes with multiple speakers, such as those involving group discussion. Over the course of a 90-minute class, even a slight weight can lead to fatigue, so it is common for lecturers to gradually let the microphone slip away from their mouths. The Panasonic wireless microphones are incredibly light, and even holding them up for a long time the sound can continue to be reliably picked up. Additionally, in the existing system the microphones were not properly connected to chargers and so they would run out of energy and become unusable during the following class; the new contact-free charging system allows the microphones to be charged by just placing them on top of the chargers, which eliminates this concern."

▲ The acoustic simulation using PASD. A measurement microphone pointed at the speaker collects test signals.

▲ Based on results measured by the microphone, it automatically calculates FIR coefficients to get close to the target characteristics without disrupting the phase.

▲ The tie-pin type microphone and hand-held type microphones from the WX-SR200A Series that were installed in Learning Studio.

▲ In Seishinkan, which was renovated in 2020, WX-SR200A Series receivers, antennas and 16 microphones are stored in a portable rack. It is DECT-compliant, so it can also be moved to be used in another classroom.

Wireless Presentation System PressIT

▲ Screen sharing from PC to screen with Wireless Presentation System PressIT. The screen can be switched instantaneously with the push of a button, with no lag.

The HDMI connection allows for instantaneous, stress-free sharing of materials

A total of 21 units* of PressIT, the Wireless Presentation System that allows users to easily share their screens by just connecting it to a PC, were installed in Learning Studio. This is how Kurashina evaluates PressIT's ease of use:

"With PressIT, we can share screens without having to move seats around to hook up various cables, making it particularly useful for group discussions where there are multiple presenters. We have used a similar system in the past, but we experienced various problems, such as needing to install and load the software, the USB connection meaning that updating the OS on the device end resulted in the system becoming unusable, and so on. PressIT uses a USB connection exclusively for battery charging purposes, with the image and sound signal instead being connected by HDMI, so it is not affected by the PC version—all you have to do is plug it in! Additionally, in situations where we have guests from corporations or government offices give lectures, sometimes they bring PCs that have high security requirements, and it is prohibited to insert USB devices: since PressIT can be used even in such circumstances, this was another major advantage."

*This is the number of transmitters.

▲ All desks in Learning Studio where PressIT was installed are movable, so moving the desks freely enables group discussions.

▲ You just need to press the main button to start screen-sharing. Just press the sub button on the end to change to multi-screen, which shows up to four screens.

▲ The PressIT receiver located at the edge of the podium. One receiver can connect to up to 32 transmitters.

LCD Laser Projector / LCD Display

▲ The LCD Laser Projector PT-MZ10KJL in a medium-sized classroom. The setup has received high praise for its brightness, which can easily be seen even with fluorescent lights turned on.

▲ The Large Lecture Theater in Seishinkan also had LCD displays and LCD projectors installed. For projectors, two 13,000-lm PT-MZ13KJL units were used.

▲ A PT-VMZ60J LCD Laser Projector and a TH-55EQ1J 4K UHD LCD Display were installed in each of the small classrooms of both Keimeikan and Seishinkan.

▲ LCD Laser Projector PT-MZ10KJL

▲ 4K UHD LCD Display TH-55EQ1J

Bright, clear projection contributes to the kind of operation specifically necessary for a university

In medium-sized classrooms, one 10,000-lm PT-MZ10KJL LCD Laser Projector was installed on each end of the blackboard, projecting onto a 120-inch screen.

"We selected these projectors based on their being able to guarantee a brightness that is easy to see even without turning the lights off," says Kurashina. "Many of our lecturers teach with both the blackboard and the projector, so we wanted to make it so they wouldn't need to be turning the lights on and off in the middle of class. On top of that, the old projectors needed a good 10 or 20 minutes to restart, so if they were switched off at the end of one class they couldn't be used immediately at the start of the next class.

The Laser Projectors from Panasonic are extremely quick to start up, so they can be used whenever the lecturer wants to use them. They're really revolutionary projectors."

Displays are arranged according to the size of the classroom, to reach all the way to the students in the back

In the medium-sized classrooms, we installed two 55-v 4K UHD LCD Display TH-55EQ1J units for the rear seats, from which it is difficult to see the screen.

"Panasonic offers a wide range of sizes, and above all, the low glare has been especially highly evaluated. We sometimes show the seating chart during exams, and even the smallest letters are clearly visible!"

Comments from the Deputy Manager

Bringing an immersive class experience to the classroom

With the introduction of online classes as a result of societal circumstances, thanks to the efforts of the lecturers, we have heard positive feedback from both students and faculty regarding the positive points of online classes, with things like two-way communication through chat, screen-sharing, breaking into groups, and making it easier for individuals to speak up. On the other hand, we want students to experience a real classroom environment in order to fully utilize what's great about the university. Now that we are in an era in which more and more young people have an innate understanding of online technology, we want the classroom to be a space that is no less fascinating than their normal online activity, and we need to eliminate the boundaries between the two. Now more than ever before, it is necessary to produce sound and picture with higher quality and ease of use. PressIT is the best solution for this challenge, as it allows screen-sharing at a speed that will not hinder online communication. The sound system, which achieves sound that is easily discerned, contributes to a friendly classroom environment that does not hinder concentration.
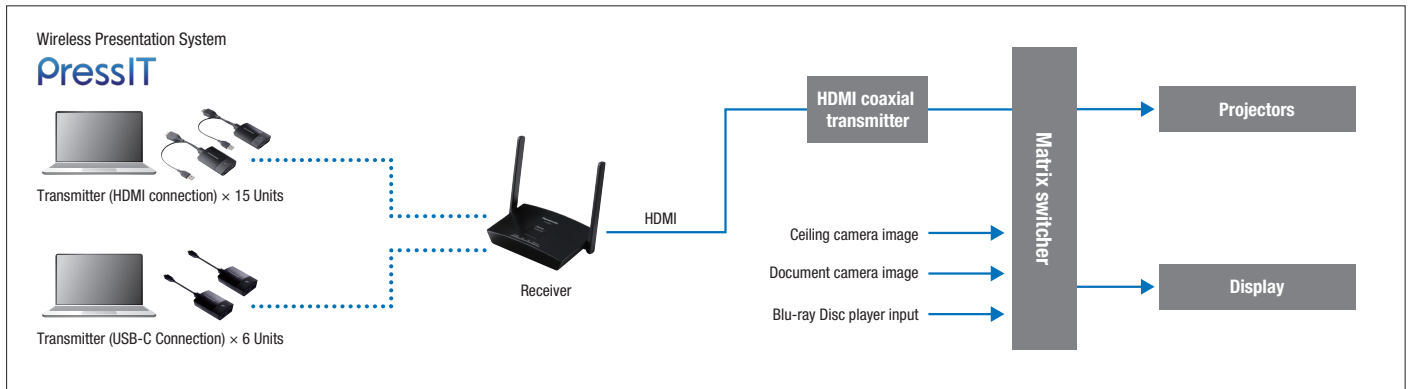
It is my hope that the system we have now introduced will make the students think "These classrooms are really great." I also hope that we can provide them with the kind of immersive experience they normally get at a movie theater, where, once the class has ended, they suddenly find themselves drawn back into the real world.
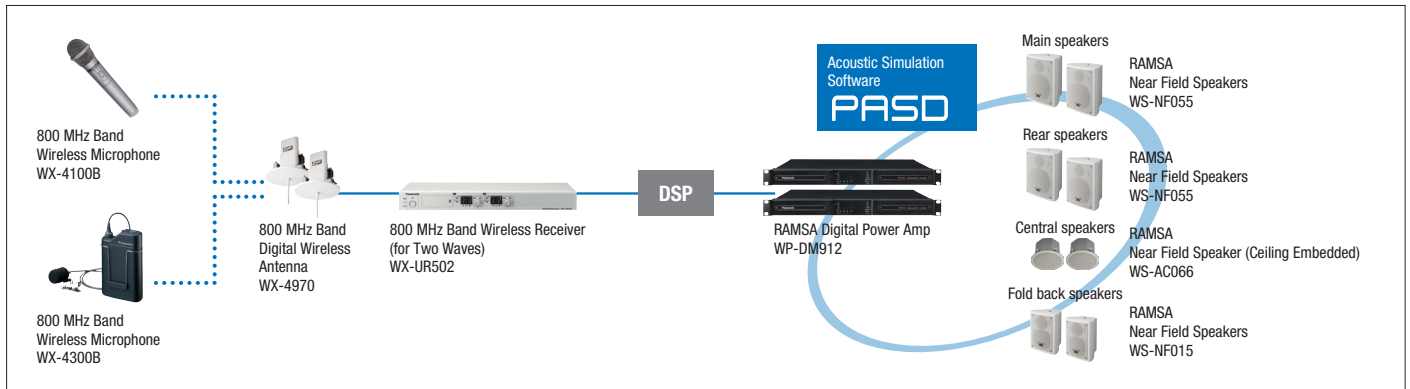
Kengo Kurashina
Information Infrastructure Division
Information System Department
Ritsumeikan University

*Affiliation at time of delivery.

Learning Studio PressIT setup diagram

Wireless Presentation System
PressIT

Transmitter (HDMI connection) × 15 Units

Transmitter (USB-C Connection) × 6 Units

Receiver

HDMI

HDMI coaxial transmitter

Ceiling camera image
Document camera image
Blu-ray Disc player input

Matrix switcher

Projectors

Display

Sample sound system layout for a medium-sized classroom

800 MHz Band Wireless Microphone WX-4100B

800 MHz Band Wireless Microphone WX-4300B

800 MHz Band Digital Wireless Antenna WX-4970

800 MHz Band Wireless Receiver (for Two Waves) WX-UR502

DSP

Acoustic Simulation Software **PASD**

RAMSA Digital Power Amp WP-DM912

Main speakers — RAMSA Near Field Speakers WS-NF055

Rear speakers — RAMSA Near Field Speakers WS-NF055

Central speakers — RAMSA Near Field Speaker (Ceiling Embedded) WS-AC066

Fold back speakers — RAMSA Near Field Speakers WS-NF015

Equipment Introduced

Keimeikan Learning Studio

- **Wireless Presentation System PressIT**
  - Base Set TY-WPS1 ×3
  - Transmitter (HDMI) TY-WPB1 ×9
  - Transmitter (USB-C) TY-WPBC1 ×6
- **1.9 GHz Band Digital Wireless Microphone System WX-SR200A Series**
  - Wireless Receiver (4ch) WX-SR204A ×1
  - Digital Wireless Antenna WX-SA250A ×1
  - Wireless Microphone (Hand-Held Type) WX-ST200 ×3
  - Wireless Microphone (Tie-Pin Type) WX-ST400 ×1
  - Charger WX-SZ200 ×2
- **RAMSA Digital Power Amp WP-DM912** ×1
- **RAMSA Near Field Speaker (Ceiling Embedded) WS-AC066** ×8

Keimeikan Medium-sized Classroom (total delivered number in three classrooms)

- **LCD Laser Projector PT-MZ10KJLW** ×6
- **Zoom Lens ET-EMS600** ×6
- **4K UHD LCD Display (55 v Type) TH-55EQ1J** ×6
- **800 MHz Band Wireless Microphone System**
  - 800 MHz Band Wireless Receiver (for Two Waves) WX-UR502 ×3
  - 800 MHz Wireless Tuner Unit WX-UD500 ×3
  - 800 MHz Band Ceiling-Mounted Digital Wireless Antenna WX-4970 ×6
  - 800 MHz Band Wireless Microphone WX-4100B ×3
  - 800 MHz Band Tie-Pin Type Wireless Microphone WX-4300B ×3
  - Wireless Charger / Charger Pack WX-4450 ×1 / WX-4451 ×6
- **RAMSA Digital Power Amp WP-DM912** ×6
- **RAMSA Near Field Speakers (for Internal Use) WS-NF055** ×12
- **RAMSA Near Field Speakers (for Internal Use) WS-NF015** ×6
- **RAMSA Near Field Speaker (Ceiling Embedded) WS-AC066** ×6

Keimeikan Small Classroom (total delivered number in four classrooms)

- **LCD Laser Projector PT-VMZ60J** ×4
- **4K UHD LCD Display (55 v Type) TH-55EQ1J** ×12

For Details on Sound Systems...
https://biz.panasonic.com/jp-ja/products-services_sound

For Details on PressIT...
https://panasonic.biz/cns/prodisplays/pressit/

For Details on Projectors for Business Use...
https://biz.panasonic.com/jp-ja/products-services/projector

For Details on Displays for Business Use...
https://biz.panasonic.com/jp-ja/products-services/prodisplays

Supplied Companies Panasonic System Solutions Japan Co., Ltd.