

# Experience with the Use of the Radiography system RADspeed Pro SR5 Version



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## 1. Overview of the Hospital

Itami City Hospital (**Fig. 1**) is located in Itami City, Hyogo Prefecture, and operates under the philosophy of providing safe, high-quality, and reliable medical care, thereby contributing to the development of regional healthcare.

The hospital has a bed capacity of 414 and 30 clinical departments, serving as a core facility in the region as an acute care hospital.



**Fig. 1** Exterior View of the Hospital

Additionally, our hospital is scheduled to be integrated with Kinki Central Hospital, with the goal of opening a new integrated hospital comprising a core hospital and a health management facility (**Fig. 2**).

After the opening, we aim to become an even more comprehensive medical institution, upholding two fundamental philosophies: providing safe and reliable medical care trusted by the community and promoting health maintenance.



**Fig. 2** Conceptual Drawing of the New Integrated Hospital

Currently, the radiology department has 17 radiological technologists who strive daily to acquire new knowledge and skills to accommodate a wide range of examinations.

There are four radiography rooms, consisting of three outpatient radiography rooms and one emergency radiography room, with approximately 2,500 radiography examinations performed each month.

Upon the opening of the new integrated hospital, the number of radiography rooms will increase to five, which is expected to result in a higher number of examinations.

With the recent replacement of the radiography system, the RADspeed Pro SR5 Version was installed in the outpatient radiography room. Here, we report the feedback from the field regarding its usage.

## 2. Features of the System (RADspeed Pro SR5 Version)

Compared to the previous model (Radiography system manufactured by Shimadzu Corporation), we found that the full-touch panel monitor on the generator console improved the visibility of examination information and made operations such as dose adjustment, which were previously performed with a dial, easier (**Fig. 3**).

Additionally, the images from the optical camera application, which will be described later, can also be checked from the generator console monitor.

The ceiling-mounted X-ray tube support (**Fig. 4**) also has a larger LCD screen on the operation unit compared to the previous model, making it easier to confirm patient information and other data from the operation unit side.



**Fig. 3** Generator Console



**Fig. 4** Ceiling-mounted X-ray Tube Support

## 3. Optional Functions

The system is equipped with various optional functions to achieve an efficient workflow. This section reports on the main options used by our staff in the clinical setting.

### 3.1 Optical Camera Application

This system is equipped with an optical camera built into the collimator section, enabling the use of several applications useful for supporting radiography. The images from the camera can be checked at two locations: the operation unit of the ceiling-mounted X-ray tube support and the generator console monitor.

This allows technologists in both the radiography room and the control room to double-check the patient's status, the radiography region, and whether the irradiation field is appropriately set, thereby contributing to the prevention of medical accidents and radiography errors.

During positioning, the detector region, irradiation field, and AEC detection field can be overlaid and observed in live view (Live View Display Function), providing support for confirming areas that are difficult to check visually.

Although this function is not available in our system configuration, for radiography requiring fine angle adjustments, such as in orthopedics, there tends to be an increase in the number of retakes. For such cases, there is also a function to support retakes by referring to the LAST IMAGE of the previous position (Last Position Display function).

When proceeding to radiography, the Motion Detection mode can be activated by pressing the button on the wireless hand switch (**Fig. 5, left**). This enables the detection of patient motion from the initial position and displays an alert if motion

is detected. By adding this function to visual observation, the frequency of retakes due to body motion can be reduced. Furthermore, since the hand switch is wireless, exposure can be performed from any desired position.

These camera application functions have been included starting with this newly installed system, and we believe they contribute to dose reduction by preventing medical accidents and radiography errors. Additional functions are expected to be added in the future, and we look forward to further updates.

### 3.2 Auto Positioning Function

With the infrared wireless remote control (**Fig. 5, right**), smooth movement of the ceiling-mounted X-ray tube support to the positioning location and control of the collimator have become possible. By linking this Auto Positioning function to each radiography menu (up to 90 positions) in the APR, detailed settings such as SID and angles can be performed with the remote control.

This allows the X-ray tube to be moved from standing to supine position without taking one's eyes off patients who may be at risk of falling. Regarding automatic operation, the system is designed to stop immediately when the finger is removed from the remote control button, ensuring a high level of safety.

In addition to the selected radiography menu, up to five positioning locations can be registered separately, enabling various uses such as pre-aligning the X-ray tube to the standing or supine Bucky according to each facility's workflow.



**Fig. 5** Left: Wireless Hand Switch (Bluetooth)  
Right: Remote Control for Auto Positioning (Infrared)

### 3.3 POWER GLIDE Function

Motors that assist operation are built into the ceiling-mounted X-ray tube support, reducing the operator's burden. Since the motors are installed in the ceiling-mounted section, they do not interfere during operation.

The assist level can be selected from three stages - High, Middle, and Low - according to the operator's preference. We found that examinations could be performed efficiently by switching the assist level: using High or Middle for large-area movements, and then switching to Low for final fine adjustments. A thoughtful feature is that Low is automatically selected when the collimator lamp is lit. Switching is easily done with one-touch operation on the X-ray tube support's LCD screen.

Furthermore, when retracting the X-ray tube to an unobtrusive ceiling position before and after radiography, even smaller or female technologists can do so with one hand.

### 3.4 Reduction of the Burden on Radiological Technologists

General radiography involves a large number of examinations per day compared to other modalities, and operations are mostly performed manually, leading to a significant physical burden on the operator. To alleviate this burden, we introduced the Auto Positioning and POWER GLIDE functions. All radiological technologists in our hospital are involved in general radiography, and several female technologists are also on staff.

Many have commented that the system reduces physical burden and helps prevent human errors due to fatigue.

Based on my own experience using these functions, I believe they are useful features that increase examination efficiency and reduce the physical burden on the operator.

### 3.5 Speed Shot Function

In this system, the X-ray tube anode starts high-speed rotation in advance when the collimator lamp is lit, so the ready-up time at exposure is only 0.8 seconds, enabling rapid exposure.

This function is useful for patients who have difficulty holding their breath or maintaining posture, as well as for infants and children where timing of exposure is challenging.

## 4. Collimator with Auto Filter (Standard Feature)

By incorporating settings into each radiography menu, the auto filter function enables the collimator filter to switch in conjunction with the menu. Four states can be preset: Cu 0.1 mm, 0.2 mm, 0.3 mm, and no filter. Appropriate selection can contribute to dose reduction.

## 5. Other Detailed Features of the System

### 5.1 Lower Hand Grip

A hand grip is attached to the lower rear side of the ceiling-mounted X-ray tube support operation unit, enabling all-free operation from this position (**Fig. 6**). As a result, even when the X-ray tube support is at a high position, it can be easily reached.

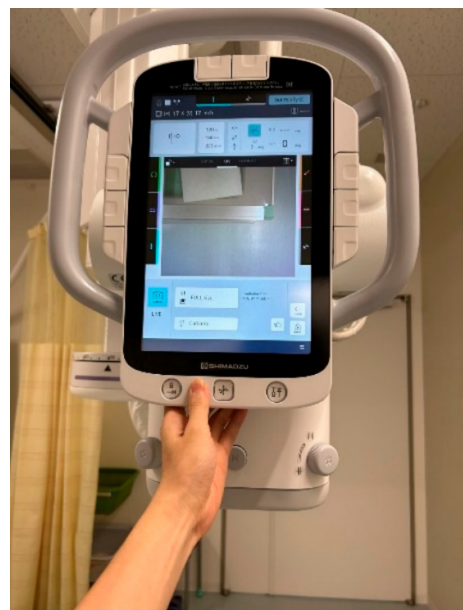


Fig. 6 Lower Hand Grip

### 5.2 Rear Switch on the Column Side

This system is equipped with a rear switch (**Fig. 7**) on the column section at the back of the ceiling-mounted X-ray tube support, allowing operation from the rear side.

This switch is necessary in situations such as radiography on a stretcher in the emergency room when it is not possible to move to the front of the X-ray tube support. The single-axis movement buttons are light enough to operate with one hand and can be used in various ways.

Regarding the all-free button, unless one hand is touching the handle on the front side of the support, the power assist will not activate, resulting



**Fig. 7** Rear Switches on Column Section

in heavier operation. Although this might be a technical necessity, we feel there is room for improvement.

## 6. Conclusion

Here, we summarize the feedback and impressions from the field after the installation and use of this system.

Our hospital has a comparatively high volume of general radiography procedures, and we believe the physical burden on technologists is significant compared to other modalities. Although we strive to perform our duties with the utmost care, there are instances where fatigue or haste leads to human

error.

We found that the system is equipped with many options to support this aspect. The POWER GLIDE function significantly lightens X-ray tube operation, reducing fatigue; however, some have commented that there is a mismatch between the timing of the assist motor activation and the force applied by operators unfamiliar with the system, resulting in awkward operation.

For this reason, Shimadzu Corporation provided operational training before the system was put into service.

Regarding the optical camera application, we felt that by selecting the necessary options for each facility, it can provide useful support. At our hospital, the live view display on the monitor of the ceiling-mounted X-ray tube support operation unit enabled confirmation of the irradiation field in situations where direct visual confirmation during radiography was difficult, resulting in a reduction in retakes due to radiography errors.

In emergency radiography, we believe that, in addition to accuracy, it is important to conduct examinations quickly without taking one's eyes off the patient. In such situations, the rapid ready-up with the Speed Shot function and the ability to perform exposure from any position with the wireless hand switch were found to be extremely useful.

In recent years, attention has focused on the evolution of CT and MRI, giving the impression that radiography systems have not seen many updates. However, by introducing this system and experiencing its new functions, we were able to appreciate its usefulness and future potential.