# Service Vision Design for Smart Bed System™ of Paramount Bed

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**Design thinking, a popular approach in business today, helps companies to see challenges in the field from users' viewpoints and to devise solutions creatively using designers' sensitivity and techniques. This trend has expanded the scope of designing to cover not only object forms but also intangible forms such as services. Against this background, Fujitsu Design Ltd. develops solutions through human-centered design, including device/interface, space, and communication design. We have recently collaborated with Paramount Bed Holdings Co., Ltd. to create a service vision in the field of medical care and develop a video that illustrates the future of care beds. This paper explains the process of creating this service-vision video on the basis of user experience (UX) design, introducing Paramount Bed's Smart Bed System, which utilizes ICT to manage biometric information in an integrated fashion.**

## 1. Introduction

The domain of design activities in the field of ICT is now expanding beyond hardware and screen design to service design, which includes intangible things such as experiences obtained through the use of products. Additionally, designers are making extensive contributions to new business areas such as the sharing economy.

As part of this trend, designers are promoting user experience (UX) design, which starts with the value of the user experience when imagining new products and services. In this way, they are discovering latent needs for products and services and developing new products on the basis of ideas driven by those needs.[1)] Consequently, in addition to pursuing the aesthetics of products, which has been a design strongpoint up to now, designers can provide customers with research capabilities for making detailed observations in the field and discovering hidden phenomena using power of expression to visualize the value of user experiences.[1)] Fujitsu Design Ltd. develops design processes that place importance on the user as a starting point in a variety of products and service fields related to ICT.

As an example of a service using UX design, we describe our production of a concept video presenting the service vision of the Smart Bed System manufactured by Paramount Bed Holdings Co., Ltd. (hereafter, Paramount Bed).

## 2. Project background

Paramount Bed is a leading manufacturer of beds in the healthcare field with applications for medical care and caregiving. It researches and develops medical care and caregiving systems using ICT with the aim of solving diverse social problems in healthcare such as the aging society and shortage of medical care personnel.

The Smart Bed System uses bed-mounted sensors to continuously measure physical conditions such as heart rate and respiration rate while the patient is simply lying on the bed without using anything attached to the patient's body. It can also determine a patient's current state, such as general movement, being away from the bed, sleeping, and awakening. Additionally, the system can read vital signs such as body temperature and blood pressure by linking with devices used for measuring vital signs equipped with a communications function. The information measured and acquired in these ways can be shared with a bedside terminal, nurse station, and electronic medical record system (**Figure 1**).

At Paramount Bed, much thought was given to

presenting its healthcare vision in conjunction with its announcement of the Smart Bed System capable of uniformly managing a variety of vital signs. The company consulted with Fujitsu on the concept of a service design using ICT and the production of a video for conveying this concept to concerned parties. As a result, we undertook the planning and production of a service-vision video for the Smart Bed System as a co-creation endeavor with Paramount Bed.

In the production process, we held a workshop to extract the future vision that we wanted to convey to customers using mind maps to visualize developers' ideas and other novel techniques for promoting idea generation. We then integrated the ideas that we obtained into a single story that the viewer of the video could intuitively understand and empathize with.

## 3. Production process: workshop

Prior to production, we sat down with in-house personnel involved in healthcare businesses to better understand social trends and related technologies in the medical care and caregiving fields and to acquire the knowledge needed for generating new ideas. We then held a co-creation/idea workshop with about ten participants made up of Paramount Bed project members and Fujitsu designers.

### 3.1 Recognizing issues and setting targets

The workshop began with the project members from Paramount Bed describing current issues in the medical care and caregiving industries and what they would like to achieve in medical care and caregiving through their Smart Bed System. While discussing what was just presented, we then visualized and shared the issues raised by individual project members and their ideas using the mind map technique to extract an image of target users and core selling points. Through this activity, we came to realize that the target users would not only be the patients using the bed but also medical care personnel and caregivers. We therefore decided that the concept of this video would be a message that includes all of the above people, namely, "Bed Side Care—Toward a Future of Better Medical Care and Caregiving from Point Closest to Patient."

### 3.2 Generating ideas

To satisfy the needs of the target users identified by the method described above, we executed an idea-generation process. The Smart Bed System was developed on the basis of the concept of using technologies such as vital-sign sensing and network communications while envisioning its use at both medical care sites such as hospitals and caregiving

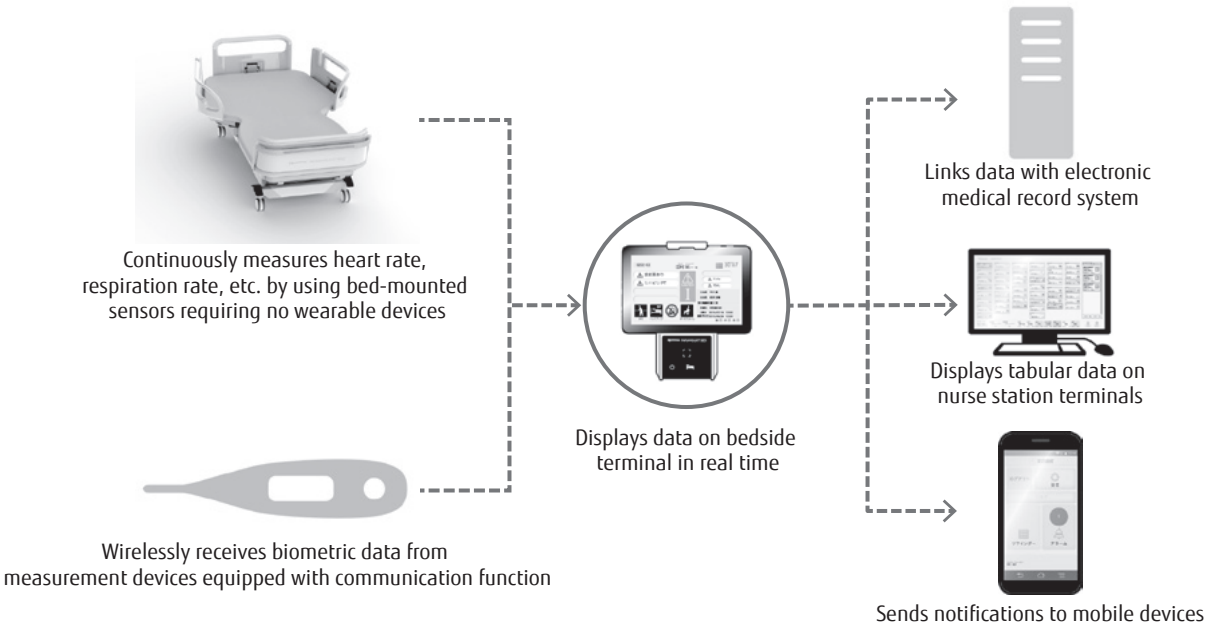


**Figure 1**
**Basic configuration of Smart Bed System.**

sites such as care homes and patients' own homes. With these preconditions established, we encouraged free and open thinking to illustrate a future method of using a bed in a way that would provide value to users.

In particular, we used techniques like brainstorming to generate a wide range of ideas. In this way, we were able to distinguish different viewpoints by sharing each other's ideas in addition to generating ideas individually. We were also able to generate new ideas by combining the obtained ideas. The generated ideas were then presented through illustrations that could be posted on a wall using the "gallery walk" method so that all workshop participants could look them over (**Figure 2**).

By voting on the ideas that best expressed the sentiments targeted by this project and that viewers could strongly empathize with, we narrowed down what should be focused on and compiled the points that should be conveyed in the video.

## 4. Production process: video production

On the basis of the configuration established by the activities described above, we shot scenes of patients, medical care personnel, and caregivers using the Smart Bed System and edited the video, making use of computer graphics to demonstrate the usage of the network system.

**Figure 2**
**Using "gallery walk" method to view generated ideas.**

### 4.1 Creating a story

We clarified three key items through the co-creation/idea workshop: message to be conveyed, target users, and ideas to embody the message. To integrate these three items and create a single story, we listened carefully to the individual viewpoints of patients, doctors, nurses, and caregivers and considered a variety of usage scenes. After sharing the message that we wanted to convey with Paramount Bed, we made detailed corrections, ultimately deciding on the following six scenes as those that should appear in the video (**Figure 3**).

1) Vital sign reading without wearing any device
2) Real-time sharing of patient information
3) Early diagnosis/prevention to reduce risk of major illness
4) Efficient bed operation at hospital admission/discharge
5) Collaborative care with home care and community
6) Creating a society with smiles all around

It is important that a video be able to evoke empathy in the viewer through a story in a limited amount of time. To this end, we centered the video on Smart Bed System usage scenes that could intuitively convey the desired message instead of describing product functions in a logical manner. To create a video with a consistent mode of expression, it was necessary to focus on the experiences that could be obtained by using the Smart Bed System from a user's point of view and to integrate individual ideas. At the same time, we wanted to maintain the connections between user-experience values that must be conveyed in each scene and the technologies needed to achieve that user experience, so we established those connections for each scene and embodied them in illustrations (**Figure 4**).

### 4.2 Producing an expressive video

Our work continued after the workshop by having the Paramount Bed project members participate in the composition and production of the video story. At that time, we endeavored to improve the quality of the video by making sure all concerned agreed upon a detailed method of expression, such as whether the content conveyed the intention of the ideas put forth by the workshop or whether the content diverged from the reality of caregiving sites.

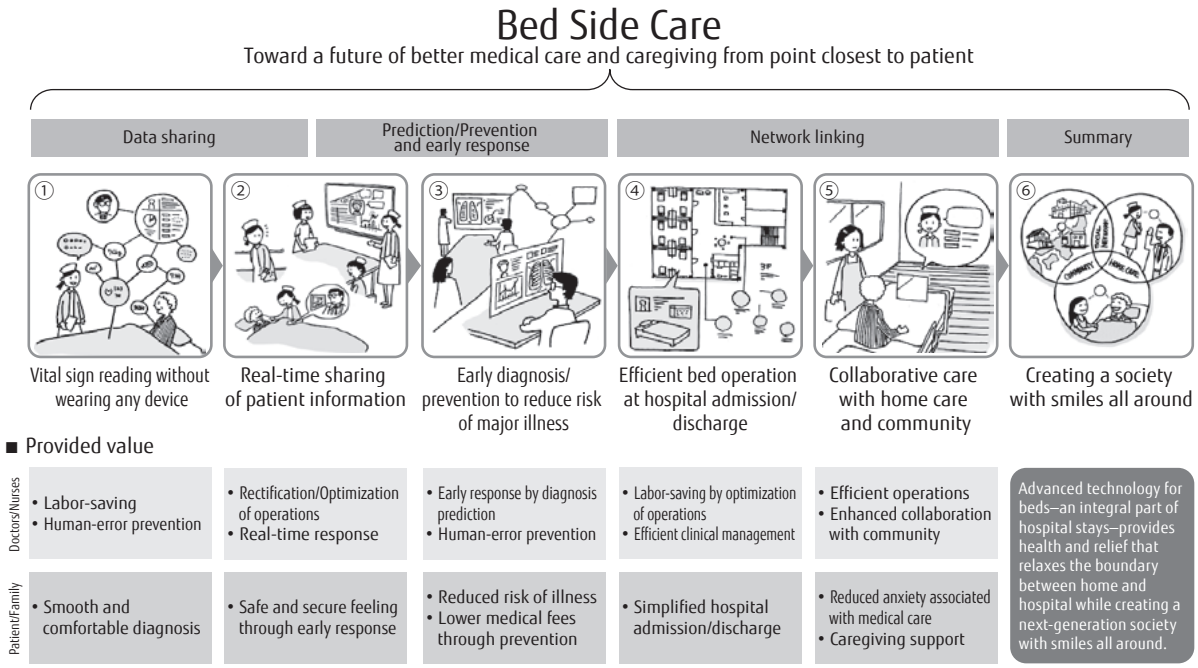


**Figure 3**
**Composition of video story.**

## Scene 1: Vital sign reading without wearing any device

■ Video image

- Switch from issues affecting existing sites to a future approach
- Visualize measurements made by Smart Bed System (body temperature, heart rate, respiration rate, sleep state, ...)
- Sense patient's vital signs, conversation, etc., and show nurse the data obtained
- Share patient data with medical interview sheet (or electronic medical record) in real time, and check remotely
- Show how nurses can devote time previously required for recordkeeping to their patients

■ Devices/Information appearing in video

- Sensing information: Vital signs and conversation (displayed in air or on a wall, or on a tablet, wearable devices, etc.)
- Measurement devices: Body temperature, blood pressure, etc. (bed-based sensing; no devices shown)
- Interview sheet, electronic medical record: Vital signs, conversation, sleep state, etc. (24-hour, real-time updating)

■ Base ideas


**Figure 4**
**Embodying each scene through illustrations.**

As a video that centered on bed-usage scenes that aimed to convey value, its main components were live-action scenes in which a variety of personalities appear. However, to convey the unseen value of using and linking data made available by sensing, digital expression using computer graphics was also essential to the production process. By combining live-action shots with computer graphics in this way, we were able to incorporate both elements of the Smart Bed System in the video and achieve a level of video expression that conveyed a possible future (**Figure 5**).

### 4.3 Coordinating with management

During the above activities, the Paramount Bed project members made an effort to understand their management's line of thinking at each phase of the project while issuing progress reports and confirming management intentions. These actions produced results—a review meeting before an actual exhibit was held with the president of Paramount Bed and other members of the management team, and positive comments were received on both the content of the video and the corporate message. As a result, there was no need for extensive modifications, which meant that we were able to focus on final adjustments to enhance the expressive power of the video for the upcoming exhibit.

### 4.4 Presentation and response at exhibitions

The video was presented together with a concept model of the Smart Bed System at the International Modern Hospital Show held in July 2015. While many of the corporate booths limited their exhibits to current products, the Paramount Bed exhibit attracted attention for its outlook on the healthcare society of the future and its leading role in this field. The video has since been used in a variety of situations such as in-house training at Paramount Bed and academic meetings.

## 5. Conclusion

This paper described the application of UX design by Fujitsu Design to the production of a service-vision video co-created with Paramount Bed to portray how the hospital/caregiving bed of the future should take shape. In this project, the two companies were able to perform a thorough study on the basis of a user's point of view, which enabled the project to be completed in a relatively short period of time (about two

* Data provided by Paramount Bed Holdings Co., Ltd.

**Figure 5**
**Producing expressive video scenes with computer graphics.**

months) from the initial brainstorming to a presentation at an exhibition. In general, a project undertaken by two companies will divert from initial plans due to a divergence in thinking or internal circumstances. In this project, however, the study always returned to the value of the user experience, which enabled us to proceed without wavering from the central premise.

Design thinking for creatively producing solutions from the user's point of view is attracting attention as a technique for thinking of new intangible things such as ideas. However, of equal importance is the construction of a system for facilitating communication among all concerned including management to foster creativity. This combined effort with Paramount Bed to achieve this through a variety of activities was a valuable experience for us at Fujitsu Design.

Service design provided by Fujitsu Design must extend to product and system development and business operations as well. To this end, we will devote ourselves to establishing an even closer relationship with our customers on the basis of user-experience value. We will also continue implementing our measures for generating ideas and transforming those ideas into business and work to achieve an even better service vision.

## References

1) K. Saso: Why Design Thinking Is Necessary in 21st Century Business. CrossMedia Publishing, 2015 (in Japanese).

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