Introduction

Hello, everyone. My name is Satoru Iwata, President of Nintendo Co., Ltd. Starting from today, I'd like to deliver a unique (perhaps unprecedented) series of interviews explaining the vision behind Wii, our revolutionary new console. Over the course of the next few weeks we will hear from those who were actually involved in the development of this console. Given that I will interview my own employees, this is a somewhat peculiar experiment. Nevertheless, by talking face-to-face with the developers, I wish to record for posterity the course that led to the creation of Wii, and the background behind its development. There are many things that only they will be able to recount. I hope you enjoy it.

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Part 1 - Using State-of-the-Art Technology in Unprecedented Ways

Iwata With the final model of Wii in front of me, I cannot help but think, "This could not have been accomplished if we had tried to make a new game console in the conventional manner." Why is Wii the way it is? What kind of idea was the basis for the development of Wii? I hope I can deliver the answers to these questions with this series of interviews.

First of all, I would like to ask some questions to Mr Takeda, who has overseen and coordinated the entire project. How did you feel when you had the initial idea to develop this kind of console? And what are your impressions as you look upon Wii in its completed state?"

Takeda We started developing Wii right after Nintendo launched the GameCube. You know, as soon as we complete one system, we start thinking about the next one. Needless to say, we don't design new components or technologies from scratch. Rather, we have to base our designs on existing technologies. In the world of technology, there are so-called Roadmaps (overviews of proposed technologies/products) that are used by each industry in order to make general forecasts about where semiconductor technology is heading, as well as the evolution of disc and wireless technologies. Engineers and developers normally refer to these Roadmaps while developing hardware that they plan to release in the future. Looking again at the completed Wii, I feel that it has turned out to be something completely different from what was predicted in the mainstream technology Roadmaps.

Iwata What gives you that impression?

Takeda This may sound paradoxical, but if we had followed the existing Roadmaps we would have aimed to make it “faster and flashier.” In other words, we would have tried to improve the speed at which it displays stunning graphics. But we could not help but ask ourselves, “How big an impact would that direction really have on our customers?” During development, we came to realise the sheer inefficiency of this path when we compared the hardships and costs of development against any new experiences that might be had by our customers.

Iwata When did you start feeling that way?

Takeda It must have been about a year after we started developing Wii. After speaking with Nintendo's development partners, I became keenly aware of the fact that there is no end to the desire of those who just want more. Give them one, they ask for two. Give them two, and next time they will ask for five instead of three. Then they want ten, thirty, a hundred, their desire growing exponentially. Giving in to this will lead us nowhere in the end. I started to feel unsure about following that path about a year into development.

Iwata OK, now I would like to ask some more detailed questions to Mr Shiota, who has been in charge of the technological aspects of Wii. First of all, briefly tell me what you have been working on.

Shiota Well, I was in charge of Wii semiconductor development. Of course, Nintendo doesn't develop semiconductors by itself, so I worked on developing them with our business partners.

Iwata The development of semiconductors can be one of the most important factors in determining the performance of new systems. What were you originally expecting during the initial development phase, and what has turned out to be different in the end?

Shiota At the risk of oversimplifying, I would say that the technologies that form the basis of all semiconductors are not that different from each other. On the other hand, how these fundamental technologies are applied depends on the device itself. Wii takes full advantage of state-of-the-art semiconductor technologies, but its application of them differs greatly from that of other devices. So, while the fact that we are using state-of-the-art semiconductor technology does not differ from my original expectations, the way in which we are using them has turned out to be very different.

Iwata Could you be more specific?

Shiota Mr Takeda also mentioned this, but normally when you decide to use new semiconductor technology, you do so solely for the sake of more extravagance and higher performance. In the case of the CPU, you try to progressively improve its processing power, which in turn raises its power consumption and increases its size. Sophisticated semiconductor technology is required to realise this goal. While you could use such cutting-edge semiconductor technology in order to facilitate this kind of extravagance, you can choose to apply this technology in other ways, such as making chips smaller. We have utilised the technology in this way so that we could minimise the power consumption of Wii. If the chip becomes smaller, we can make the size of the console smaller. With a smaller chip and minimised power consumption, Wii can be left on 24 hours a day. This is what I meant when I said that the way Wii makes use of state-of-the-art technologies is completely different from the way in which they are used in other devices.

Iwata In general, no engineer hates higher performance. As an engineer, didn't you experience any inner conflict when it was decided that we would not necessarily take Wii in the direction of sheer horsepower alone?

Shiota Yes, there was some conflict. To be honest, I even felt quite anxious about it. After all, it takes a lot of courage to divert from the Roadmaps. I was especially concerned when it was still not very clear to me what could be done with such a machine. The hurdle of reducing power consumption could be overcome. We were certain that we could achieve this goal in the early stages of development. But the conflict and concern did not go away until it was clear how this would change the gaming experience. Once the concept of Wii as “a console where something new happens every day” became clear, we were certain that we had made the right choice. This concept is made possible by the fact that Wii can stay on for 24 hours a day.

Iwata Looking back at all the development history of Wii, were there any particularly memorable turning points?

Shiota Let's see. When we were struggling to reduce the power consumption, there was a point in time when we simulated how power consumption would change in existing devices if we applied cutting-edge semiconductor technology to them. In the case of the GameCube, we discovered that the power consumption could be reduced to between one-third and one-quarter of the consumption of the GameCube's

semiconductors. I was really impressed with these results. Of course, I was surprised by the data itself, but it was also the moment at which I was struck by the originality of Nintendo. Normally, when making new devices, companies compete with each other on the basis of “How much faster is the CPU, how much more memory is there, and how many more polygons can be displayed?” But Nintendo posed the question “How much can we decrease power consumption and maintain performance?”

Iwata Why do you think we were able to engage in that kind of argument?

Shiota Above all, I think it must have been because Nintendo is always trying to do something new and different. This message has been spread not only within Nintendo, but to other companies as well. As a result, our development partners have naturally tended to present us with new technologies and ideas. It was this background of going against the norm that gave birth to Wii.

Takeda Of course, the issue of performance was not secondary. Anyone can realise “low performance with low power.” Others tend to aim for “high performance with high power.” With Wii however, Nintendo alone has pursued “high performance with low power consumption.” So, while Wii embraces cutting-edge technology and high performance, the direction it is aiming in is completely different from that of previous systems. When we look at the automobile industry, not every car is following the same evolutionary course. While some are trying to make faster cars, others are gathering public attention around the world with their hybrid engines. If automobiles can be used as a metaphor, our industry has always been trying to compete over horsepower, even though not all cars are made to compete in F1 races.

Shiota Just as hybrid cars have created a new emphasis on “environmental performance,” I believe that Wii has also discovered new values. Having said that, however, Nintendo has never shied away from technological competition. On the contrary, we have integrated a number of highly technological elements into Wii.

Takeda Using state-of-the-art technology in unprecedented ways is far more complex, difficult, and requires more technological know-how than simply using the technology to improve performance. The Wii system is far more complex than that of the Nintendo 64 and GameCube. Furthermore, since Wii is compatible with GameCube software, we have not only tried to create something new, but we have also retained some of the old functionality. Honestly, this was not an easy task, but I think we can proudly present to the world a new console that will have so much appeal for so many.

(To be continued...)

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Part 2 - A Design For Everyone

Iwata Next, I'd like to talk about the structure and design of Wii. Takamoto-san, please explain to us what you were responsible for.

Takamoto I was responsible for developing the structures of the system and the controller. More specifically, the things inside the device, such as the drive unit, the metallic parts and connectors of the shield casing, as well as other exterior plastics. In other words, I was responsible for the design of all the main components other than the circuit boards.

Iwata Wii certainly stands out in comparison with the other game consoles that are available. Firstly, it's by far the smallest. Tell us a bit about this.

Takamoto Well, as you said, one of the most striking aspects of Wii is its small size. Our specific target in developing this console was to make it no larger than 2 or 3 stacked DVD cases. Of course, this was a direct order from you! (laughs)

Iwata I actually stacked up a few DVD cases and said, "I'd like to make it about this size!" (laughs) I guess this must have come as a shock to you?

Takamoto "Well, I was more stumped than shocked! (laughs) When we first started developing Wii I was somewhat dubious as to why we needed to make it so small, but I came to understand this vision as development progressed. That is to say, I came to realise that Wii should be inconspicuous when placed around the living room TV. As you know, TVs always have a lot of AV equipment packed around them. With the GameCube, the console itself had to be taken out and placed in front of the TV because of the cables leading from the controllers. Wii, on the other hand, is wireless. The very nature of the Wii Remote means that the user will have to place the console near their TV. Of course, this imposes physical limitations on how big the device can be. We envisioned that it might be placed in a narrow space beside the TV, or in a tight space on top of some other equipment. We really felt that we had no choice other than to accomplish our goal of making Wii fit in this space. In the end, it was impossible to make it the size of 2 DVD cases, but we did somehow manage to make it as thick as 3 DVD cases. (laughs)"

Iwata I know it was my suggestion, but it wasn't an easy hurdle to overcome, was it? Tell us about some of the problems you encountered.

Takamoto One particular problem was the disc drive. As I'm sure you can imagine, once the space needed for the casing and other components has been taken into account, the drive unit itself can be no thicker than a single DVD case. This was a real challenge. And of course, if you make it too thin, then the issue of robustness comes into play. At the end of the day, no matter how powerful Wii is, it's still used for playing, so we have to assume that it will also be used by children. Of course, Nintendo has particularly stringent standards to ensure that our products don't break easily! (laughs) So, we carried out test after test in order to strike the perfect balance between size and strength, failing again, and again, and again... Thanks to this process of trial and error, we were finally able to achieve a thickness of 3 DVD cases by inserting some reinforcing plates.

Iwata The need to make Wii both small and strong was, fundamentally, a contradictory proposition. What other problems did you face in addition to making the console small?

Takamoto As well as striving to make Wii as small as possible, we were also particularly keen to use a slot-loading disc drive. Using a drive with a lid, like the GameCube's, would have saved a few millimeters. In addition, slot-loading drives are expensive and their durability is a cause for concern when compared against drives that actually open. But again, we had to take into consideration where the console might be placed. Given that TVs nowadays have very little extra space around them, and given that a slot-loading drive allows for more compact access, it was an

absolutely indispensable feature when thinking about our customers. Based on the kind of lifestyle our customers lead, and due to the fact that our controllers are wireless, I think we made the right decision.

Iwata So, let's talk to Mr Ashida next. Ashida-san, please tell us what you were responsible for.

Ashida Certainly. I was in charge of the actual design of the console and the controller, as well as that of the packaging and logos.

Iwata You've been responsible for designing Nintendo hardware since the SNES. What did you focus on when designing the Wii?

Ashida I first asked a lot of employees for their opinions regarding the hardware. This goes back to what Takamoto-san said earlier, we really wanted to avoid causing any more clutter around the TV, in terms of shape as well as size. For example, the Nintendo 64 can only fit in a limited number of places because of its many curved faces. One of our major design goals, therefore, was to create a device that can be placed anywhere. That said, many people felt that the GameCube was designed like a toy. We realised this, of course, but all Nintendo hardware since the SNES had been designed with that explicit image in mind. It's not that we ignored how AV equipment was designed. Rather, we placed more emphasis on designing our hardware with entertainment in mind. Now, however, the age range of our users is changing, so I felt that we had to strike a balance between designing it as a toy and designing it as a piece of AV equipment.

Iwata Again, these are two contradictory propositions.

Ashida Yes, it wouldn't look very natural beside a TV if it was too toy-like. And likewise, it wouldn't really be an amusing form of entertainment if it looked like some kind of AV equipment. With this in mind, we came up with "A Design for Everyone", a concept created in order to allow as many people to use Wii as possible. Making Wii into a device that everyone likes is more important to us than a having fiercely individualistic design. Indeed, we wanted to make Wii into something that would be treated more like a piece of interior design, rather than a toy or a piece of AV equipment. One of the things I did, therefore, was to form a Wii design team. Simply put, all our previous hardware designs had been the work of a single designer. To design Wii, however, I gathered many of our younger designers and together we came up with a number of ideas. Needless to say, the process leading up to the finalization of the current design was far from smooth sailing...

Iwata What was the turning point in Wii's design process?

Ashida Our direction was firmly decided when we hit upon the idea of combining the system with the stand. Our initial target was to make Wii the size of 2 or 3 stacked DVD cases. With this target in mind, it was only natural that the console became rectangular in design. We would have reached a design dead end if that had been our only vision. I mean, it's only rectangular! (laughs) Fortunately, our young designers came up with the stand. By combining this with the Wii itself, we realised that we could achieve a number of new expressions, even if Wii itself is simply rectangular in appearance.

Iwata The way that Wii is perceived would be very different if it wasn't for the stand, right?

Ashida Yes. The console alone can be placed either upright or on its side. By combining it with the stand however, it presents itself in an entirely new manner, with the Wii fitting snugly into the stand. To tell you the truth, the combined Wii and stand design was finalised only a few weeks before the device was presented at E3.

Iwata I remember what happened when you first showed me the design. I gave it an instant thumbs-up, didn't I?

Ashida Yes. (laughs) We showcased it to the world soon after at E3.

Takamoto Since I was still designing the inner workings at the time, I was very surprised!

All (laughter)

Takamoto The internal and external designs are usually carried out in tandem, and ideally we would discuss these over a considerable period of time. You can therefore imagine how shocked I was not to hear about this showcasing in advance! (laughs)

Ashida Yes, I'm so sorry! (laughs) Takamoto-san and I have always talked over everything first. But then, and only then, I didn't have time to talk with him. Time passed so quickly discussing the design with our young designers...

Takamoto Of course, we had previously discussed the structural design of the console, the basic shape and approximate size, and in doing so we had reached a consensus. But even so, presenting it to the world so suddenly like that...

All (laughter)

(To be continued...)

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Part 3 - Wii: Born Out of A Concrete Vision

Iwata Listening to everyone here talk about Wii reminds me that the most important thing was clearly defining our vision. Even if it was a vision without a precedent.

Takeda That's really true. Without a goal based on a concrete concept, I don't think Wii would have become what it is today.

Takamoto Even from the standpoint of having designed the console's structure, I do not think Wii would be as small as it is now if we had not made the early design presentations at E3 with the goal of making it as thick as 2 or 3 stacked DVD cases.

Ashida For example, Mr Takeda came in the middle of the design group's discussions and practically forced us to implement the glowing blue pilot lamp. (laughs)

Takeda At first, I only intended to request it for E3, but seeing as it was received so well on the show floor...

Takamoto We found a way to cram it into the console. (laughs)

Iwata I really believe that we've come this far because of our vision. If you simply repeat the process of building up the hardware specs, then you just end up with higher costs and a larger console. I think a better approach is to have a clear vision, decide what you want to accomplish, and then work towards your goal.

Takamoto The internal fan is another case in which having a clear goal from the beginning allowed us to achieve what we wanted. Because we had the clear goal of not letting the fan spin at night, the LSI team had to minimize the heat released from the ICs (integrated circuits), and the design team had to take into consideration the heat that would be trapped inside.

Iwata We really couldn't give up on that goal once we decided to make Wii a sleepless machine that stays on 24 hours a day. If the fan is spinning in the middle of the night, I could just imagine mothers everywhere pulling the plug right out of the wall because they thought it had been left on again. (laughs)

Shiota From the point of view of designing the semiconductors, the objective of not spinning the fan was a considerable hurdle that had to be overcome. We already had strict restrictions on the heat that could be released from the ICs due to the small case. In IC development, there are some factors that remain unknown until you actually try to make the ICs, but the time from design to completion is very long. This means that a trial and error approach doesn't work, and doing so would not allow for revisions to be carried out within the schedule. Of course, IC development tools are also evolving and it is possible to perform simulations in advance, but the truth is that development tools cannot keep up with IC evolution and ICs rarely work as predicted by simulations. Another big issue is power consumption, but it's incredibly difficult to accurately predict how much power will be consumed. You're never entirely sure of how many watts will be consumed until the chip arrives from the factory and we can fire it up. For me, these were difficult challenges that I hadn't experienced before.

Iwata Reducing power consumption is something that's always been considered for handheld gaming devices, but this is the first time it has been thought of for a home console, isn't it?

Shiota Yes, it is. So we had to rely on the know-how of Nintendo's handheld gaming device team, and the cooperation of the chip manufacturer as well. We also tried to incorporate means of lowering power consumption into the entire system, and not just the IC. It felt like trying to achieve the impossible, but fortunately Nintendo has a history of knowing how to work in unfamiliar situations. A variety of techniques for quickly identifying and solving problems have been accumulated over the years,

and I think this was an important factor in achieving our goals.

Iwata In contrast to the creative vision of the product we wanted to make, we also had the rather practical problem of keeping the costs down. Did you struggle with that, Takeda-san?

Takeda Of course. But since the creative vision included the idea that Wii should not be overly extravagant, meaning that the console is a somewhat specialized device containing only carefully selected technologies, it was not that daunting a task from the outset. However, money was spent on certain aspects of Wii, such as the slot-loading drive and the stand, even though these are areas in which Nintendo would not have considered investing in the past. The reason for this, as Mr Ashida mentioned in the design discussion, is that one of our main goals is for Wii to be accessible to everyone in the family, rather than just another toy for the children. From that point of view, we also had to consider Wii's appearance and fashionability, even if these are contradictory goals when you're the one counting the pennies. (laughs)

Ashida A simple example of this is the polished-looking design of Wii. Up until now, Nintendo products have used a slightly textured plastic because it's affordable and does not show much wear and tear. However, since we decided that a sleek design would be more suitable for Wii, a high-quality surface has been adopted, although the actual plastic is the same. I think this direction of pursuing sleeker designs will apply not only to Wii, but to all future Nintendo products.

Iwata Put simply, the appearance of a game console is now more important than it used to be, isn't it?

Ashida That's right. Of course, we weren't just aiming for a classy look. Rather, we wanted Wii to appear accessible to all kinds of people, instead of just focusing on keeping costs down. So we've created something that maintains the functionality and durability of a toy, without looking like one.

Takamoto Well, as much as the design team tried to improve the quality, my team, working on the internal design, had to find ways to keep costs down. But it's always like that, isn't it? (laughs)

Ashida (laughs)

Takeda And once these two start arguing, they always come to me!

All (laugh)

Iwata Well, that's how something is created over several years, isn't it? We're now nearing the end of the discussion. Could each of you please say a word or two about Wii to everyone who has been waiting so patiently for it?

Shiota It has already been reported by several media outlets that Wii is different from any previous game console. I think most people have to actually get their hands on it before they understand this difference and just how original Wii is. I hope you all have a chance to experience this for yourselves!

Takamoto We were incredibly conscious of where Wii would be placed within the home when we designed it. I hope that you make it the focal point of your living room and enjoy it with the whole family.

Ashida Umm, from the point of view of the designer, I would like to say that I hope you use Wii in its upright position, with the stand!

All (laugh)

Takeda Wii is the first system from Nintendo that we can continue to be involved in (via operating system updates) after the customer buys it. This means that Wii will greatly expand and diversify the ways in which people will enjoy games in the future. I hope you are looking forward to it as much as I am.

Iwata Thank you very much. After taking this time to look back on what we've done, I have once again felt that all our efforts were worthwhile. I don't know exactly how to put it, but I am feeling quite excited about the future myself.

(The controller will be discussed next.)

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