

Looking Back the Last 10 Years of AVN Development

Keizou Ishimura
Katsuyuki Nakai
Satoru Nagamoto



Abstract

This year we celebrate the 10th anniversary of the "AVN", the product combining audio, visual, and navigation system, launched in 1997. At the beginning the most popular AVN in the aftermarket was a hideaway car navigation system with a monitor display on the dashboard. But FUJITSU TEN has appealed the merits of in-the-dashboard type monitor displays, which are hard to be stolen and to stay out of the way of an inflating air bag, and developed easy-installed AVNs that match the interior design. They also have original functions ahead in integrated technology and/or services. As a result the 'AVN' brand has become the most popular category in the car navigation market.

This paper describes the development history of the FUJITSU TEN AVN in the last ten years.

1

Introduction

The "AVN" is now a popular car navigation system. However, when FUJITSU TEN launched the AVN in 1997, it was a new categorized product compared to competitor's one. This year is the 10th anniversary of the launch.

Since the launch, FUJITSU TEN has developed and marketed a variety of distinctive AVNs to satisfy customers' requests. FUJITSU TEN established 'AVN' as the main category of the car navigation system, by continuously marketing products with original functions ahead in sophisticated integration technology and/or services.

On this 10th anniversary, this paper describes the development history and features of main AVN models.

2

History of AVN**2.1 Background of AVN Development**

It was in the fall of 1995 when the development of the AVN began. At that time, most of the car navigation systems were hideaway types combined with monitors on the dashboard. FUJITSU TEN started the development of the original AVN to aim distinctive products and increase its share in the sluggish aftermarket. The key words in the planning stage of the development were "Downsizing," "The first in the industry or world," "Best quality for security and safety," and "Cost performance beyond the original value". Those keywords made us create the advanced AVN concept. The AVN project started as soon as the concept was fixed.

2.2 Challenges of Development

The AVN was the first product that FUJITSU TEN collaborated with a contracting company for designing. There were mainly three big challenges in the development.

2.2.1 Challenge in Size

The first challenge was to integrate all functions into the 2-DIN size (100mm in height × 178mm in width). Various components such as a CD deck, a MD deck, audio board, and car navigation board had to be assembled in the small volume. Arranging them in that space seemed like a jigsaw puzzle never to be solved for us. It was a challenging issue, however, we solved it by newly developed technologies such as miniaturizing and highly integrating each device.

2.2.2 Challenge in Heat

The second was a major heat problem because of:

- ① **heavily congested configuration inside the AVN**
- ② **new heat sources, such as a navigation board**
- ③ **AVN stacked close to the deck**

There was no way out for heat. As a solution, we adopted a fan on the backside of an AVN to release the heat for the first time.

However, we could not find a low noise fan for a vehicle in the market, so the fan noise became a new problem. After various trials, we finally solved this problem in cooperation with a fan maker and could reduce the fan noise.

2.2.3 Challenge in Noise

Another big challenge was to deal with the noise emitted by the highly congested design / layout of the AVN. The unnecessary radiation noise could affect not only the receiver inside the AVN but also devices outside the AVN. We took measures against the noise by strengthening the shield, reducing source noise generated by devices, and improving the design method of the printed wiring board.

2.3 Birth of AVN

After solving various problems mentioned above or others for the nearly two-year development period, the first AVN (Fig. 1) debuted in 1997. Its retail price was ¥298,000. It was so expensive for a CD-ROM navigation device, compared to the competition products, that even some of us in this project were worried about that high price. However, the appreciation of the product in sales promotion activities and advertisement made our worry wipe out. The catchlines were "Media in One Body", "Feel Conscious," and "Just Fit". Accordingly, the AVN got a good reputation as "fitting comfortably", "easy-to-install", and "easy to change CDs at hand."



Fig. 1 E7707AVN (Launched in Jul. 1997 / ¥298,000)

3

History of AVN

Since the first AVN was marketed in 1997, FUJITSU TEN has commercialized various AVNs with original functions and services beyond contemporary products. This section introduces flagship AVNs for the Japan market and the history of the AVN.

Figure 2 shows the history of the AVN in the aftermarket.

■ 1997: The first aftermarket AVN (Fig. 1)

This is the three (Audio, Visual, and Navigation system)-in-one product that all basic functions can be available without accessories.

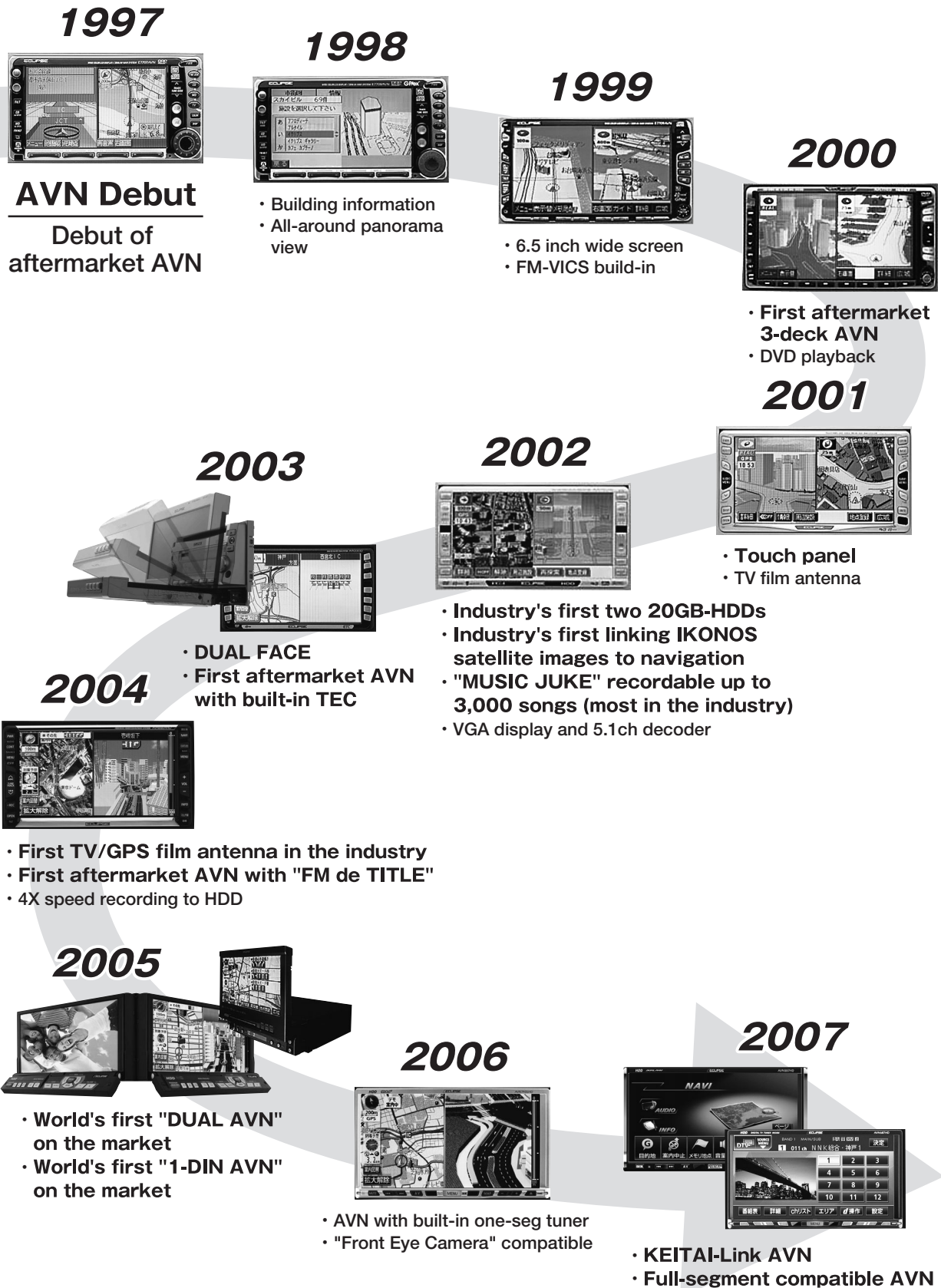


Fig.2 Transition of AVN

Advantages in the three-in-one products are; easy-to-install, simple visual design, easy operation such as changing CDs at hand, etc.

■2000: The first aftermarket DVD-AVN with built-in three-deck (Fig. 3)

This is the first aftermarket AVN which unify a DVD navigation system with an audio-visual device. Our original integrating technology could make three decks (DVD, CD, and MD) fit in the 2-DIN size.

FUJITSU TEN established the distinctive "scaling-down" technology by developing this three-deck built-in DVD-AVN.



Fig.3 AVN5510D (Launched in Jul. 2000 / ¥280,000)

■2001: The DVD-AVN with a touch panel (Fig. 4)

This is the DVD-AVN which has a touch panel display for speedy and easy operation. This touch panel operation by directly touching buttons and menus displayed on the screen eliminated the conventional joystick, and made a big impact on the market. Since then, the touch panel screen method has been a mainstream operation of car navigation system.

In those days, most of TV antennas were rod antennas attached on the rear window. FUJITSU TEN developed the film antenna mounted on the front window earlier than competitors to reduce man-hour for attachment and to make a cabin comfortable.

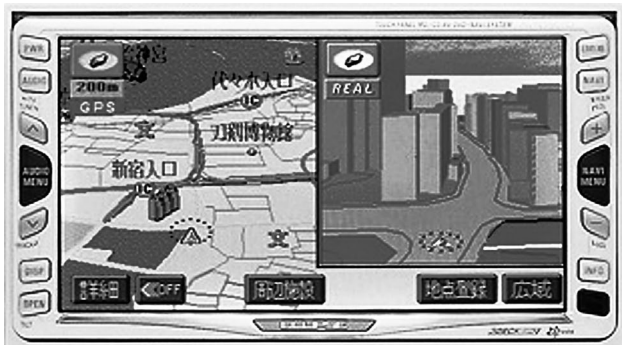


Fig.4 AVN5501D (Launched in Jul. 2001 / ¥283,000)

■2002: The world's first HDD-AVN with two 20GB HDDs (Fig. 5)

This is the first HDD-AVN with two 20GB HDDs in the world: one for navigation use, the other for audio use. Those HDDs enable fast access and have the "MUSIC JUKE" function which can store up to 3,000 songs (the maximum recordable number in the industry), which made it a blockbuster AVN of FUJITSU TEN.

Other main functions are listed below.

- Linkage the IKONOS satellite images to the navigation system (First as an aftermarket product)
- High-definition VGA monitor display screen
- Dolby digital 5.1ch / DTS 5.1ch decoder



Fig.5 AVN9902HD (Launched in Nov. 2002 / ¥375,000)

■2003: The DUAL FACE AVN (Fig. 6) / First as a aftermarket AVN with built-in ETC (Fig. 7)

• DUAL FACE AVN

This AVN with a 7-inch in-dash monitor display has two faces: one is the "navigation face" in use of display, the other is the "audio face" when the display is retracted. The "audio face" is also effective as a part of anti-theft measures.

It was so hard to create the good visual design when the screen was retracted, but at the end we could make the excellent design not to disturb the driver's view and to ensure safety.



Fig.6 AVN9903HD (Launched in Oct. 2003 / ¥355,000)

• The first aftermarket AVN with built-in ETC

This AVN is the first aftermarket product with built-in ETC unit. So it can give video guidance and audio guidance about ETC lanes and tolls.



Fig.7 AVN3303D (Launched in Oct. 2003 / ¥221,000)

■2004: The first aftermarket AVN with "FM de TITLE" (Fig. 8)

This is the first aftermarket AVN with the "FM de TITLE" function using FM stereo broadcasting. The AVN can record music at 4× speed any time and also has the chasing playback feature. In this device the integrated TV / GPS film antenna for the AVN was adopted for the first time.



Fig.8 AVN8804HD (Launched in Jul. 2004 / ¥315,000)

■2005: AVN with two world's first features, Dual-AVN (Fig. 9) and 1-DIN AVN (Fig. 10)

• The world's first DUAL-AVN

The AVN is equipped with the "Dual Display" function. Two different images can be watched from the different viewpoints on one display screen. For example, navigation route is available from the driver's viewpoint and on the same screen DVD pictures are enjoyed from the front-seat passenger's viewpoint. This feature can provide comfortable environment for the front-seat passenger, keeping assisting the driver to drive safely.



Fig.9 AVN8805HD (Launched in Nov. 2005 / ¥300,000)

• The world's first 1-DIN size AVN

At this model all functions of audio, visual, and navigation devices were integrated in the 1-Din size AVN for the first time in the world. The functions of HDD navigation, HDD audio, DVD / CD compatible deck, TV / radio tuner, 7-inch display screen, etc. are same as those of the 2-DIN size AVN.

We utilized all our know-how of "scaling-down" technology used for all AVN to this AVN. Competitors have never been able to market a 1-DIN AVN as of today.



Fig.10 AVN075HD (Launched in Nov. 2005 / ¥265,000)

■2006: AVN with built-in one segment tuner (Fig. 11)

This is the first aftermarket AVN with a built-in tuner for the one-seg whose service began in 2006. It enables the stable reception at wide service area.

Users can enjoy stable images of the terrestrial digital one segment broadcasting even while driving.



Fig.11 AVN7406HD (Launched in Nov. 2006 / ¥237,000)

■ 2007: KEITAI-Link (mobile phone-linked) AVN (Fig. 12) / AVN with built-in full-segment tuner (Fig. 13)

• KEITAI-Link (mobile phone-linked) AVN

The AVN has the function linked with the mobile phone to access to the latest information at the special site anytime, anywhere. This acquired information may be transferred to a navigation device through the infrared communication port of the mobile phone.



Fig.12 AVN777HD (Launched in Jun. 2007 / ¥270,000)

• AVN with a built-in full-segment tuner

This AVN includes not only a built-in digital tuner for the full-segment terrestrial broadcasting but also a built-in B-CAS card slot for the first time in the industry.

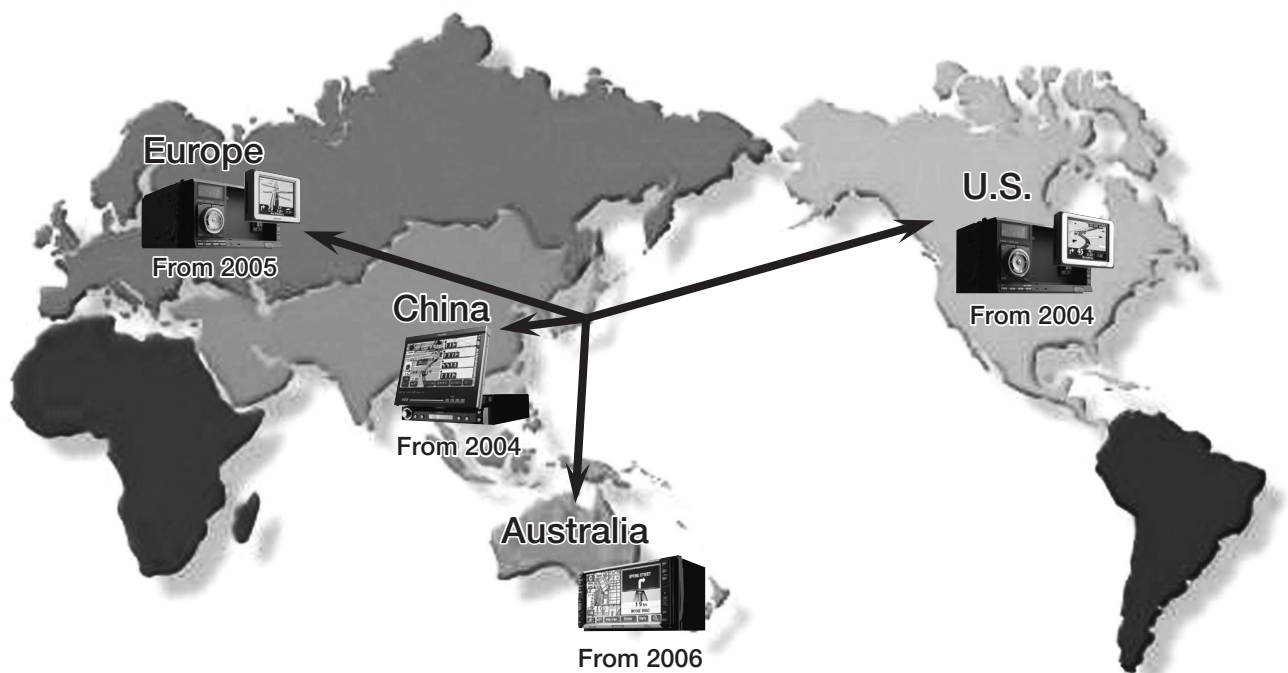


Fig.13 AVN687HD (Launched in Nov. 2007 / open price)

4 AVN in The Global Market

Since 2004, FUJITSU TEN has expanded the AVN sales in the global market as well as in the domestic (Fig. 14).

Besides 2-DIN size AVN, we have also sold 1-DIN size AVN, a mainstream AVN overseas, at the overseas market since 2005. And more, FUJITSU TEN began to bring an unprecedented portable AVN to the North America and Europe in 2007, collaborating with the Dutch PND manufacture, TomTom International BV, in response to an increasing demand at PND (Portable Navigation Device) overseas market.



※ Flagship models in respective regions

Fig.14 AVN in The Global Market



Fig.15 AVN2210p (Launched in May 2007)

5 Future Development

The AVN has become the mainstream in the car navigation market in Japan. Meanwhile AVN manufactures have sold AVNs with various kinds of features like communication function with other devices since 2007. FUJITSU TEN also developed the "KEITAI-Link AVN" function, which sends information to mobile phones through the infra-red communication port, to increase sales of the AVN with its related new services. Hereafter it will be important to enhance the comprehensive car navigation system with not only the hardware but the related services.

On the other hand, the PND is popular overseas, and it's critical how to promote the portable AVN at the overseas market, as a strategy, in the future.

We must market new products meeting the change, the trend, and the demand of the market.

6 Conclusion

Celebrating the 10th anniversary of the AVN, this paper has briefly described the past and future development of the AVN. When we just started the AVN development, many people had been worried about the feasibility of the first product and its pricing. That was why we were very happy when we brought the first AVN to the market for the first time and it was sold.

With pride and confidence as an AVN pioneer, FUJITSU TEN will continue to develop new technologies free from prevalent stereotypes and to market new products that users really want and that make users happy. That is the way to make our dreams come true.

<Trademarks>

"AVN", "MUSIC JUKE", "FM de TITLE", and "KEITAI-Link AVN" are trademarks of FUJITSU TEN LIMITED in Japan.

"Dual View" is trademark of Sharp Corporation.

Profiles of Writers



Keizou Ishimura

Entered the company in 1982. Since then, has engaged in product planning of AV equipment by way of structural designing of car audios and working as a resident for our North American factory. Currently the Department General Manager of the Planning Department 2, Products Planning Division, CI Group.



Katsuyuki Nakai

Entered the company in 1989. Since then, has engaged in product planning, mainly, for new fields. Currently the Team Leader of the Planning Department 2, Products Planning Division, CI Group by way of secondment to TOYOTA MAP-MASTER INCORPORATED.



Satoru Nagamoto

Entered the company in 1991. Since then, has engaged in product planning of navigation and audio related products. Currently in the Planning Department 2, Products Planning Division, CI Group.