Immersion System

Designed for Yamataian Power Armor/Mecha technologies and Starfighters by Kage Yaichiro and Project THOUGHT and completed in YE 33, the Immersion System is a three dimensional Audio/Video processing system intended for use on the various levels of Kessaku Systems' Integrated Electronics System (IES). While an Armor Integrated Electronics System (AIES) is all that is required to run all the software, some Power Armor using such a system do not have the hardware to fully utilize its abilities due to cost. Hardware such as the kind found on Starfighters or Mecha/THOUGHT Armor, or other Compact Integrated Electronics System (CIES)-based units are more likely to have superior abilities and allow fuller functionality. It is designed to work directly with the THOUGHT Software Package, but is considered separate from this system in that it can also work in a stand alone fashion and on a less advanced computer system.

It is intended to provide a "skin vision" much like the more powerful aspects of the NH-series and overlay it with advanced audio and video triangulation capabilities. Due to its design, it is only compatible with NH-series life forms with digital brains such as the NH-22C Yamataian, the NH-27 Nekovalkyrja, and the NH-29. Some systems on which the Immersion System is installed on can allow a non-NH series pilot to access video and audio through more conventional means as a secondary option, but this is not always the case.

History

Developed through YE 32 and into YE 33, the Immersion System evolved from of the idea of sight through Active Camouflage sensors combined with the need to add equally detailed sound detection abilities and the ability to help the Yamataian brain to process them. Initially, these were different systems which were unique to the Project THOUGHT prototypes, but the need for them to heavily communicate to attach sounds to video data of possible threats eventually made their integration a more obvious solution. This also allowed standardization of the software among the prototypes, like the process which developed the THOUGHT Software Package.

This system was developed for inclusion in assorted Project THOUGHT systems and prototypes, all Type 32 Pilot Pods and Type 33 Pilot Pods receiving a software update to be rendered compliant.

Sub-Systems and Functions

Video System

The Video System is designed to provide a full 360 by 360 degree sphere of visual data, allowing the pilot to process some or preferably all of the movement and information in their area. While this includes infrared and UV light, they are not usually displayed by default unless it is configured as such. Due to the massive amount of on-the-fly 3D graphics processing, this is largely handled by the Quantum Computer's IES and not the pilot's own brain. Still, the pilot will remember key information after disconnecting from

the system – simply not the exact vector of an enemy unit or its exact distance at any given point. The IES will be able to give detailed information on the mission with this system – more so than previous "block box" recording devices.

The data can also be compared to the sound data from the Audio System in real time to quickly assign noises to people or objects, to more quickly determine the source of a threat such as a gunshot or a charging weapon. This ability extends to other sensors, allowing the computer to overlay the visual data with non-visual sensor information by visual cues, such as dots for friendlies and hostiles outside of visual range, relative orientation, and formation data. The system is even capable of magnification/zoom as well as night vision, depending on the capabilities of the optical systems used. This typically manifests as an enhanced Skin Vision, much like certain classes of Nekovalkyrja such as the NH-27, with additional clarity and target marking abilities. For those not accustomed to skin vision, there can be a fair learning curve for using this method of sight.

Depending on the hardware available and the skills of the pilot, this is accomplished in one of four ways.

Panoramic Vision

Panoramic vision is accomplished by using an Active Camouflage system to directly view the area in true 360 degree by 360 degree vision. This is the clearest and best possible method of panoramic view, though it takes the most graphical processing. Regardless of how close the enemy gets, it is possible to have no blind spots if the craft on which it is installed is well made.

Sampled Vision

Sampled Vision is artificial 360 degree by 360 degree vision, created by processing a finite number of conventional optics on the frame of the machine. This takes less graphical processing and is notably cheaper, but the images are less pristine than in Panoramic Vision. It is also possible for enemies to get in a blind spot of some of the cameras in melee combat when extremely close, forcing the pilot to view the threat more directly.

Directed Vision

Directed Vision is standard binocular vision which Yamataians are more accustomed to, plus the ability to detect movement in general. If movement happens outside the range of normal vision in this mode, the Yamataian will sense this movement and be able to dodge or turn to face it. This mode of detection feels vague to the Yamataian and is only quantified by how "big" the change feels. A change which is larger or closer to the pilot will be more easily noticed than, say, a sniper in the distance. This is the standard operating mode for rookies who have not learned how to react fluidly to Panoramic/Sample Vision and have no experience with Skin Vision, meaning the bulk of Yamataian rookies. It is still superior, however, to a a standard Power Armor helmet's display.

Legacy Vision

This is vision as if one had two eyes and nothing more to detect movement. It is the most simple and least processor intensive, and is usually used for those who just cannon handle enhanced vision or for those systems which lack the power or hardware to process any of the other types. It is thus rarely used.

Audio System

The audio system uses multiple Crystalline Audio Sensor Arrays on the frame of the craft to detect sound and plot it in all three dimensions. Since the computer can detect the minutest changes in volume and pitch, it can be used to isolate sounds and their direction with just one sample. If an enemy fires a round, for example, the computer will be able to more precisely pinpoint the source of the sound where infantry may be forced to turn their ear in the general direction of the noise and wait for a second shot to hone in on their target. It should be noted that while echoes may make false hits at times, especially if a sniper is in operation, an experienced soldier will be able to quickly determine which sounds are echoes and which sound is the true gunshot and possibly even identify the round used. Two quad-crystal sensors, one on either side of the head unit of a Power Armor, is considered a minimum for three dimensional sound detection and audio quality sufficient for NH-27 and NH-29 ears.

The Audio System can also significantly reduce the volume of ambient noises, such as the constant hum of a specific ship system or the sound of a Power Armor's own footsteps. Wind can also be notably reduced in volume, but not as effectively due to its unsteady nature. The purpose of this functionality is to aid a pilot listening for unusual sounds by removing distracting sources of audio. This functionality should be used with discretion, and only once the ambient sound has been determined not to be relevant to the operation. A pilot silencing their own footsteps without sufficient experience may make more sound than they realize, for example, and be more obvious to the enemy.

Ultra Low and Ultra high frequencies above and below that of hearing (picked up with the proper quad-crystal sensors) are typically not replicated to the pilot, but they can be useful if properly utilized by very experienced personnel. Monitoring low frequencies creatively can be used to detect explosions at range or even nearby enemy movement, due to the nature of low frequencies to travel through the ground. High frequencies can detect such things as a power source rigged to overload, or the charging of an enemy's energy weapon. These, however, require special skills to utilize and are beyond the scope of a normal pilot's training. Some basic sounds, however, can be identified by the IES and a warning can be displayed for the pilot.

Learning Curve

The learning curve for taking full advantage of the system, sadly, is notable. A soldier simply cannot take full advantage of the most advanced elements of the system right away, though Nekos who are already used to 3D hearing and vision may have an advantage in basic operation. Fortunately, the system has the capability to parse itself in lesser modes for the pilot, geared toward how a standard PA might function. Due to this, a pilot can be effective in the machine from the beginning, while training to attain a level of mastery over the system and the machine on which it is installed. Pilots should not expect to be

able to fully utilize the data from all directions or be able to accurately and perfectly locate or identify 3D sounds right away. It takes practice to accomplish this, as well as to achieve control of the supplemental functions beyond this.