

# Basic Concept and Technologies Underlying Content Production in the Multimedia Era

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**B**roadcast services in the multimedia era will enable viewers to select any program they want to see. This means that contents will inevitably be driven by competition based on market principles. Consequently, in the process of providing a large volume of high-quality contents to viewers, decreasing production costs becomes a priority for broadcast stations. That's why content production support technologies will become more important in the multimedia era. Future content production technologies, in particular, are expected to provide a more productive environment so that producers can fully exercise their creativity.

Taking this as our goal, we propose three concepts as a basis for a next-generation content production technology that is both efficient and promotes creativity. These concepts go under the titles of "More intelligent and efficient", "More flexible", and "More descriptive".

"More intelligent and efficient" is typified by the TV Program Making Language (TVML). TVML is a computer language developed for describing TV program scripts. Using TVML, a producer can describe a series of actions just as indicated by a regular script, including the movement and dialog of computer-generated characters, captions, and the playback of video and audio materials. It becomes possible to establish an environment in which multimedia contents can be prepared anytime and anywhere, as long as one can access a computer.

The Plug & Play production system is the representative research for "More flexible". Plug & Play production is a future broadcasting station system that constructs a content production environment based on computer and network technologies. Such an environment will enable contents to be created at home and

collaborative production work to be done between remotely located users. It will also enable the construction of open systems that will allow aging production equipment to be replaced at low cost and in a flexible manner. To facilitate this environment, we are developing new technologies in which producers can freely use any equipment or contents without being aware of differences in type of equipment or signal format.

The advanced virtual studio is the most promising technology in the "More descriptive" category. We have come up with a new method of producing TV programs that effectively solves the various problems of real and virtual studios. The three-dimensional information of an object would allow us new kinds of image synthesis. We developed a 3D camera, named "Axi-vision", that captures color and depth images of objects in real time. A high-speed and spatial high-resolution depth mapping method has also been developed. For example, with this system, the camera image of, say, an actor can be synthesized with computer graphic characters by comparing depths pixel by pixel.

Our virtual studio experiments show the possibility of using the depth-key method to create virtual effects without the blue back screen needed for the chroma-key method.

In the coming years, NHK will continue to create easy-to-use tools supporting the creative activities of producers and to develop flexible environments so that they can create contents anytime and anywhere. Additionally, NHK will research technologies for making programs easier to understand and more interesting, while establishing tie-ups with other research institutions, both in Japan and overseas.