

Satellite Communication and I (18)

An NHK (Japan Broadcasting Corp.) engineer Kumiko Kokatsu talks her 'rendezvous' with the broadcasting satellite and her current job at TV Central Transmitting Station.

Securing satellite radio waves is a constant battle with the rain. At NHK, we work day and night to ensure stable radio waves with a combination of accurate decisions and delicate timing, allowing us to bring clear images and realistic sound to your homes around the clock.

Japan Broadcasting Corporation (NHK) Kumiko Kokatsu

It has already been two years since I joined NHK, and was stationed in the Engineering Administration Department, Central Television Transmitting Station. I have been surrounded by wonderful managers and experienced coworkers, working day and night to secure stable feeder-links for satellite broadcasts.

Until just a few short years ago, "satellite broadcasts" were nothing more than something I watched on TV. I remember thinking "this is nothing more than just a strange channel... it's clearer than regular ground waves, but the picture becomes really fuzzy when there's a heavy rain, and in the end it just fades out completely." I first became interested in satellites when I was in university; I was studying antenna engineering and radio transmission, and I saw a job listing from NHK related to satellite broadcasts. This was back when mobile phones, PHSs, and pocket beepers were just beginning to gain popularity, and I thought it would be interesting to work in the field of radio waves. Still, I had no idea that I would be working with satellites in this type of surroundings.

One of the operations carried out in the Central Television Transmitting Station is to secure a total of three channels of radio waves: for BS1, BS2, and the Japanese High Definition TV; High-Vision. There are two feeder-link earth stations – the working station in the Broadcasting Center at Tokyo and the station within the Shobu-Kuki Radio Broadcast Center grounds – enabling operations with site diversity. One wave up-link is also available as a backup from each of the two stations in Osaka and Sapporo. Meanwhile, there are three analog broadcast satellites, BSAT-1a, BSAT-1b, and BS-3N; BSAT-1a is currently



being used as the working satellite. Satellite control has been contracted to Broadcasting Satellite System Corp., so at the Central Television Transmitting Station we conduct maintenance on the feeder-link earth station and respond to breakdowns and inclement weather, and work day to day to

ensure stable radio waves.



For the most part, securing satellite radio waves is a constant battle with the rain. The feeder-link uses 17GHz, which is a higher frequency compared to the down-link frequency of 12GHz, so rainfall can easily result in signal deterioration, and we must always be on guard for rainy weather. Particularly in recent years, there have been frequent occurrences of concentrated heavy rains caused by the “heat island” effect over Tokyo area, and the ability to make quick judgments with regard to site diversity switching is demanded. When switching between feeder-link stations, the sound is momentarily muted. For this reason, we use breaks in between programs for switching to avoid interruptions to the greatest extent possible, but when a heavy rainfall occurs without warning, we don’t have the freedom to wait for a break between programs. In this case, we have to follow the content of the program and aim for a segment that has very little sound, so we have to watch very carefully. Particularly in the case of news programs and classical music performances, there are very few breaks, so we have to concentrate more than ever.

To deal with signal deterioration from rainfall, in addition to quick decisions about station switching, we are also conducting development activities on a regular basis, and applying these developments to our operations. For example, we pick up Meteorological Agency radar information in regions that have earth stations, and make predictions regarding the movement of rain clouds. We have also developed software that selects the optimum operating station using both the reception levels of feeder-link at satellite and the reception levels of down-link at the earth station, based on past rainfall deterioration data, and use this as a guide for judgments regarding station switching.

In addition to these activities, we are also conducting data analysis in cooperation with manufacturers in relation to TWT operation in the 17GHz band – where there is still relatively little analysis data – and have achieved results in studies and tests targeting extended life.

It was in 1978 that the first Japanese broadcasting satellites were launched and satellite broadcast tests began. It is truly amazing to think that these activities began in the same year that I was born, and to see how both satellite services and I have grown and changed since then. For some time now, watching satellite broadcasts has become an everyday part of life for myself and many others, and I intend to work hard to secure the most stable feeder-links possible so that viewers can enjoy high-quality audio and video with confidence.