

SNV-12 Voters Improve China's Civil Aviation Administration Air Traffic Control and Management

The Civil Aviation Administration of China (CAAC) has improved its air traffic control and management techniques using Raytheon's Signal-and-Noise Voter (SNV-12).

The operational use of the SNV-12 significantly enhances the CAAC's ability to select and rebroadcast the best received voice signals from aircraft to their air control centers (ACC) in Beijing, Shanghai and Guangzhou.

Prior to deploying the SNV-12, the CAAC was experiencing difficulty in ensuring reliable communications.

As part of China's modernization program, three major ACCs were constructed in Beijing, Shanghai and Guangzhou including multiple upper-air traffic control (ATC) sectors. Since each of these sectors cover very large areas, multiple VHF ground radio sites are needed.

To ensure reliable communications, the CAAC used two to four remote sites to provide additional ground receiving points. The distance between these remote sites is as great as 400km, each with 4-16 channels per site. This created the need for a voting device that could cover long distance communications.

In addition, ATC design requirements stipulate that to provide the highest reliability, the voice signals from each remote site must be sent back to each ACC over both satellite and ground relay lines.

The CAAC was in need of a technology that would

resolve these problems and purchased several SNV-12 devices. The SNV-12 allows the CAAC to automatically select the best voice signals from the remote sites and present it to the Controller.

In actual operation, signals coming from different sites are connected into a single SNV-12. Signals from satellite and ground remain separated to obtain the best received signal on the ground site. The SNV-12 then

forwards the best received signal to avoid requiring the controller to manually select the line.

In Beijing, there are nine ATC sectors and two VHF frequencies per sector.

When critical messages are sent from these multiple sectors on differing VHF frequencies, the SNV is used to continuously select the signal with the best Signal-to-Noise (SNR) ratio. The SNV-12 then provides the "voted" (best SNR) output to the repeater for rebroadcast allowing the users to hear the best signal. This same method is used in Shanghai and Guangzhou using the SNV-12.



Over 200 SNV-12 Signal-and-Noise Voters are installed in China's air control centers. Pictured are some of several racks of the SNV-12s in Guangzhou.

Over 200 SNV-12 units are installed in Shanghai and Guangzhou air control centers. The CAAC also uses additional SNV-12 units to connect control centers with emergency frequencies. Each SNV-12 connects, on average, two to four channels as determined by the number of VHF sites per sector. The SNV-12s used to distribute the emergency frequency to each sector connects roughly six to ten channels.

The SNV-12s have provided a quick and optimum

method of determining the best received signal.

Trial flights have successfully been completed using the systems in Beijing and Shanghai.

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