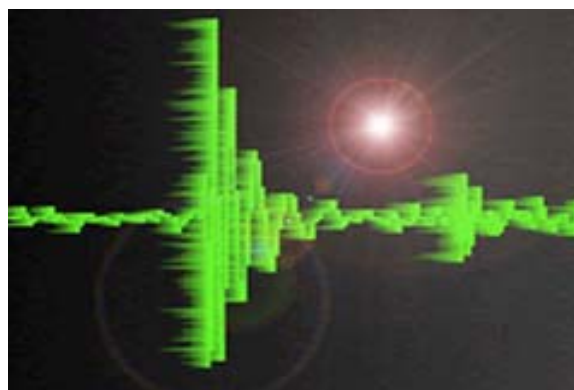


# **VATSIM's Advanced Voice Client**



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# Introduction

Roger Wilco (RW) has been used as the single tool for Voice Over IP (VOIP) communication for many years now. It has survived countless fly-ins, events and has accumulated thousands of hours of use. Although it has served its time well, a lack of updates, user support and security features has branded RW with an expiration date which has now passed.

The Advanced Voice Client (AVC) developers have taken the concept of RW and its simple user interface, and built a totally new voice library. The new AVC voice library offers:

- Greatly improved reliability for users behind a NAT firewall
- Auto Gain Control providing simplicity, equalized volumes and enhanced voice quality
- Greatly improved voice quality both aurally and network-wise
- Extremely simplified user interface
- Full backwards compatibility with current VATSIM applications such as SB2.3.5, SB747 and Servinfo Gauges
- Full backwards compatibility with current VATSIM Voice Servers

While all of the listed features make the AVC a much more reliable VOIP application, its most promising feature is its expandability. Future versions of the AVC will offer many things such as:

- Multiple Channels
- Server Security

that will make online flying even more realistic.

# Installing the AVC

1. Run the "setup.exe" file included in this package.
2. Follow the on screen instructions to select your destination folder as well as installation options.
3. After install, you will be given the option to run the AVC. It is suggested that you run the AVC immediately after install as the AVC application makes necessary registry changes for compatibility with current VATSIM software.

\*NOTE: The AVC will not respond to SB2.3.5, SB747 or Servinfo applications until it is opened once first.

# Setting up the AVC

One of the most exciting features about the AVC is the Auto Gain Control. This feature will enforce a constant volume on the network from user to user despite their microphone type or setup. Never again will you need to turn your volume way up to hear a quiet pilot, only to be deafened by a loud pilot.

The AGC works by amplifying your volume as much as 8x until it is as loud as possible but just short of distortion. This results in the optimum sound quality as the full digital resolution is being used.

To achieve the least amount of background noise with the clearest voice, your system must still be setup somewhat.

## 1. Properly set your windows mixer or headset software

Before you even begin using the AVC for voice communications, you must setup your system for optimal voice quality. If you are using a device that connects to your soundcard such as a standard microphone or plug-in headset, start by going into the "Recording" section of your windows mixer. Make sure that "Microphone" is selected as the recording device and set the volume slider to roughly half. If there is an "Advanced" tab for your microphone, click on it and be sure that "20dB Boost" is **not** enabled.

If you are using a USB audio device, you should follow the same procedure as above, using the included USB audio software.

## 2. Choose input and output devices

Launch the AVC and click on the "Setup" tab. At the bottom of the screen, you will see two drop down menus for device selection. Select the input and output device that you plan on using for voice communication. They can always be changed later and the last used devices will be saved on exit and automatically selected on startup.

\*NOTE: For the output device, you will see your hardware devices listed twice. The first set will have the prefix "Wave" and the second set will have the prefix "DirectSound." These are two different methods of sending data to your audio device and they are equally compatible in general. Some users have found that they have an increase in audio performance in one over the other. Because of this, we suggest that if you are experiencing crackling or broken audio, you should try the other.

## 3. Run the mic setup

After your devices have been selected, click on the button labeled "Setup Mic" and follow the step by step directions.

The mic setup serves the following purposes:

- 1) To calibrate an input squelch level
- 2) To detect if your mic settings are too quiet or too loud.
- 3) To allow you to hear what you will sound like to other users.

The mic setup begins with a silence test. This test evaluates the average level of background noise (computer fan, passing cars, heater etc) and remembers

the level. After the test, this level is used as a threshold, that is, if your voice level is not loud enough to be over this level, it will not be transmitted. The purpose of this is so your background noise is not amplified during pauses in your sentences. This helps to keep voice quality at it's highest.

The next part of the test listens to your voice. The AVC has the technology to quiet your voice as well as amplify it but to preserve quality, it will only adjust a voice level that's within our defined range. If your mic is quieter or louder than that range, you will see a message explaining to you that your mic is too cold or too hot respectively. The solution to this is to raise or lower your windows mixer or audio software level and run the test again. If you have full mic volume set in the mixer and the AVC still complains that your mic is too cold, try turning on the "20dB Boost" if you have it.

The last step of the mic setup is the playback of your voice. Listen carefully to your voice for clarity and noise levels. If there's a lot of static or noise, rerun the mic setup and be sure to be quiet during the test. This does **not** mean that you should make temporary changes to your room to be quiet. The AVC needs to hear the same amount of noise that will be in your room during normal operation so changing your environment just for the test will yield invalid results. The exception to this is if the AVC complains that your room is too noisy. If you see this message then you should permanently quiet your environment or get a better microphone. Built in mics are susceptible to noise because they are attached to your computer and pick up the hum of the hard drive and fans. If you do not hear your voice at all during the playback stage, check your microphone connections and settings and try again.

After passing the mic test, your squelch level is set and remembered for the future.

\*NOTE: The only times you will need to run the self test again is if you change microphone settings, switch to a different hardware or need to solve a noise issue.

#### **4. Set your output volume**

The speaker volume slider controls the output volume to your selected output device. Setting the slider all the way to the right will produce a maximum volume while setting the slider all the way to the left will be a mute. The last used speaker volume will be saved on exit.

#### **5. Choose a push to talk button**

Click on the button labeled "Change..." in the "Push to Talk" section. A popup screen will be displayed. The next button you press will be set as your push to talk (PTT) button. This means that you will only transmit your voice while holding that key down. You will know that you are transmitting if the title bar of the AVC says "transmitting." Press your new PTT button to see.

#### **6. Enter your pilot information**

Click on the tab labeled "Pilot Information" and you will see a list of required information. Enter your VATSIM ID and VATSIM password. Then choose any

one of the VATSIM servers from the drop down. This information will be used to verify that you are connected to the network.

\*NOTE: You MUST be connected to the VATSIM network through Squawkbox (or similar) before the AVC will let you connect to a voice room.

# Using the AVC

The AVC was designed to be as simple to use as possible. We believe that the online flying environment should not be cluttered with difficult setups and applications that require constant monitoring.

## **Connection Tab**

Callsign – In this field, enter the callsign that you will use to fly on VATSIM. Your callsign in the connection tab **must** match the callsign you enter in SquawkBox or you will not be able to connect to voice servers! The last callsign you used will be automatically saved on exit.

Server/Room – If you are using the AVC as a standalone client (without SB2.3.5 running) this is where you should enter the server, port and room that you wish to join. They should be in the follow format: **server:port/room**. (Ex. rw.avsim.com:3782/bos\_v\_ctr) If you do not enter a port number, the AVC will automatically default to port 3782. This means that “rw.avsim.com/bos\_v\_ctr” is equivalent to the first example. There will rarely be a time where you will need to enter a server port but the option is there for compatibility.

After typing in the room information, pressing “Enter” on your keyboard or clicking on the “Connect” button on the client will connect you to the server and room.

Another feature of the Server/Room field is the history. It will automatically save the last 5 *different* server/room combinations that you’ve used in the past. Clicking on the down arrow on the right side of the field will display the most recent entries. Click on any of the entries and the AVC will automatically connect to that room.

Room Box – The big white box displays the members of the room. You will see the callsign of anyone that is listening and/or transmitting in the room. In addition, there will always be one blank space at the top. That is the server and it is perfectly normal to see it there. As people join and leave, the room box will automatically update itself.

# Frequently Asked Questions

## **What is Auto Gain Control (AGC)?**

The auto gain control or AGC is in short a feature which ensures that you'll never have to raise your volume for the quiet controller only to be blasted by a loud pilot the very next minute. During the Beta stage, AGC serves two purposes. It constantly adjusts your output level so that you are as loud as possible without distortion. With this part of AGC running, anyone using the Advanced Voice Client will always have the proper volume level. There still remains the problem of RW users who are responsible for their own mic adjustments. To compensate for them sending Advanced voice too quiet, the AGC checks first if they are a RW or VC client. If they are VC it ignores them (they already have the proper level) however if they are on RW, it adjusts their output either up or down to set their level for optimal volume. In short this means that everyone regardless of what they set their mic level to in the windows mixer will sound the same volume all of the time.

## **Why can't I adjust my Microphone gain?**

Advanced Voice Client features AGC. This feature automatically adjusts your mic volume so that you are as loud as you possibly can be *without* distorting or over modulating. Therefore, all transmission will sound at the perfect volume to other Advanced Voice Client users despite your windows sound panel setting for volume levels. You make very broad adjustments to your microphone volume using the Windows Mixer, then AVC uses AGC to set send your voice over the network at the optimal levels.

## **Why do people complain that I am overmodulated?**

Advanced Voice Client has AGC. The feature works exactly how it should however people still using roger wilco pose a potential problem. If their sound settings are not configured for optimal quality then when they receive your voice, roger wilco will make it even louder. You'll remember from above that the Advanced Voice Client has already set your voice as loud as possible *without* distortion, therefore it will be distorted once roger wilco touches it. The solution to this is to tell Roger Wilco users to lower their volume because their system is not configured for the best sound quality.

## **Why do people complain that I am breaking up?**

Many studies and tests have been performed to make the Advanced Voice Client's networking performance top notch however it is still limited by several factors. The most noticable of which is Roger Wilco's handling of incoming packets. If a packet is late, RW continues processing sound and inserts silence where there was no data received. Because of this, it remains behind in the processing for quite some time. You have heard the results of this as the "stuttering" or "skipping" that causes a sentence to be complete but with constant repetitive bits of silence between each syllable. The Advanced Voice Client has implemented a solution to this so you should never hear it again however that's only on *your* end of the line. If the user is still on Roger Wilco then they are still vulnerable to this problem. I would like to pointout however that Advanced Voice Client's sending patterns are timed and very consistent with the hopes of reducing the possibility for a lost packet. This brings us to the second major problem causing poor voice quality and that is internet quality. With many different users on many different speed internet connections, it's very difficult to guarantee a constant and uninterrupted stream. Servers got bogged down and firewalls can cause havoc on a voice room. With that said, great improvements have

been made. Many tests have resulted in uninterrupted conversations as long as 5 full minutes on a dialup connection.

**Will the Advanced Voice Client work with ASRC 1.0?**

The short answer is no. ASRC 1.0 was designed around Roger Wilco and while Advanced Voice Client implements all of the features of Roger Wilco and more, it does them in a more efficient way. Because of this ASRC will not communicate with the Advanced Voice Client for transmissions. This only applies however to the "enhanced voice" features of ASRC. It will work perfectly normal as a standalone client the way RW was used with PC in the past. ASRC 1.1 however will include an integrated voice library with the same benefits and features as the AVC.

# Troubleshooting

## Problem

### Connection

1. When I try to connect to a server, it says "Could not connect to specified server!"

## Solution

### Connection

- i. The server you are trying to connect to is either down or does not exist. Check to be sure that you've typed in the name correctly and also that you are using the correct port (if not standard 3782).
- ii. You are behind a firewall that is blocking the AVC from connecting to the server or it is blocking the server from communicating with the AVC. If it's a software firewall, allow the AVC access to the internet.

## Problem

### Voice Quality

2. While using Flightsim, the AVC crackles and has poor voice quality.

## Solution

### Voice Quality

- i. If you are using DirectSound for an output device, try using WAVE. If you are using WAVE, try DirectSound.

## Problem

### Mic Setup

3. Every time I run the mic setup, it says that my microphone is cold.

## Solution

### Mic Setup

- i. If the test is reporting that your microphone is cold but you can still hear yourself during playback, try the following:
  - Talking closer to the microphone
  - Turn up the mic volume in the mixer
  - Add 20dB boost setting
  - Be sure your mic is plugged into "Mic in" on your soundcard *not* "Line in"
  - Get a new microphone
- ii. If you cannot hear anything on playback, your mic is not plugged in properly or is muted. Check all connections. You might try recording your voice with the sound recorder to see if it can hear you.

### Mic Setup Cont...

4. Every time I run the mic setup, it says that my microphone is hot.
  
5. Every time I run the mic setup, it says my background noise is at the same level as my voice.
  
6. Every time I run the mic setup, it says my background noise is higher than expected.

### Mic Setup Cont...

- i. If the mic test is reporting that your mic levels are hot try the following:
  - Talk farther away from the mic
  - Turn down the mic volume in your mixer
  - Disable 20dB mic boost
  
- i. This error message can be one of two possible problems. Either your noise level is normal and your voice level is too low, or your noise level is high and your voice level is normal. The deciding factor is the squelch number issued at the end of the mic setup. If the number is less than 300 then the problem is that your voice level is too low. You should follow the procedures listed above for a cold mic. If the number is above 300, then your noise level is too high. Follow the procedures listed below for a high noise level.
  
- i. If the mic setup reports that your noise level is too high, then you should try the following steps:
  - Reduce your mic volume
  - Disable the 20dB boost
  - Quiet the noise level in your room (fans, TV, radio etc)
  - Get a condenser mic that is less sensitive to faint noises

\*Note: Built in microphones are prone to high noise levels because they are attached to the computer and pick up the fan and hard drive vibrations.

# Credits and Thanks

The following list of people have contributed a significant amount of help to the AVC project and they deserve a huge thank you. Without them it couldn't have been done.

In alphabetical order...

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