nPoint AC-1 Payload Quick-Start Guide

SyTech nPoint connects the VHF or tactical radio onboard an uncrewed aircraft to the remote pilot over Starlink, cellular, satellite, mesh, or other IP networks.

The nPoint system allows the remote pilot to transmit and receive through the aircraft's onboard radio, communicate with air traffic control and nearby aircraft, and remotely change frequencies when supported by the integrated radio. The remote pilot can communicate through the aircraft's radio from any location, regardless of the distance between the pilot and the aircraft.

What's in the box

The box holds 4 items. The payload is the only part that goes into the UAV.

Item	What it is
Payload (nPoint RIB and Radio)	The SyTech nPoint and AirCom AC-1 VHF airband radio, combined as one unit
ACD-57 control head	Physical control head, used to program the AC-1 radio and verify Virtual Control Head actions
VHF airband antenna	For ground and bench evaluation
Coax cable	Connects the antenna to the payload



Your RADIUS server on AWS is already set up for your payload. You do not need to configure devices, channels or users.

Payload specifications

Parameter	Value
Power input	12–30 VDC
Power draw	5 W nominal, 24 W while transmitting
Dimensions	145 × 62 × 58 mm (L × W × H)
Weight	460 g, including 5’ cable and 3A fuse
Ethernet	10/100BASE-T, RJ45
Radio	AirCom AC-1 VHF airband
Factory IP address	192.168.0.30 – Defaults to 192.168.2.60 if it can’t reach the configured server

Bandwidth

Figures include TLS1.3 and TCP overhead.

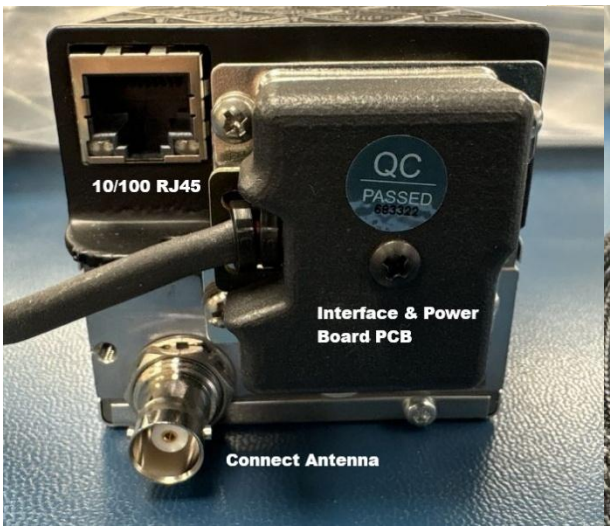
Traffic	Rate
Audio, one direction	38 kbps
Acknowledgements, other direction	10 kbps
Idle keep-alives	1 kbps peaks, every 10 seconds

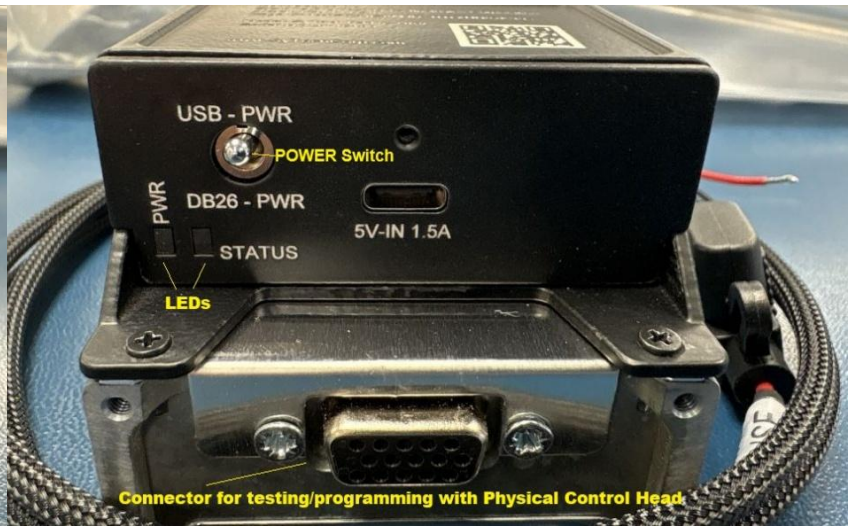
Network requirement

This is the number one reason the system does not connect
TCP ports 7467 and 7468 must be open on the UAV's LAN and WAN, so the payload can reach your RADIUS AWS server. Check every firewall, router and modem between the payload and the internet.

Install the hardware

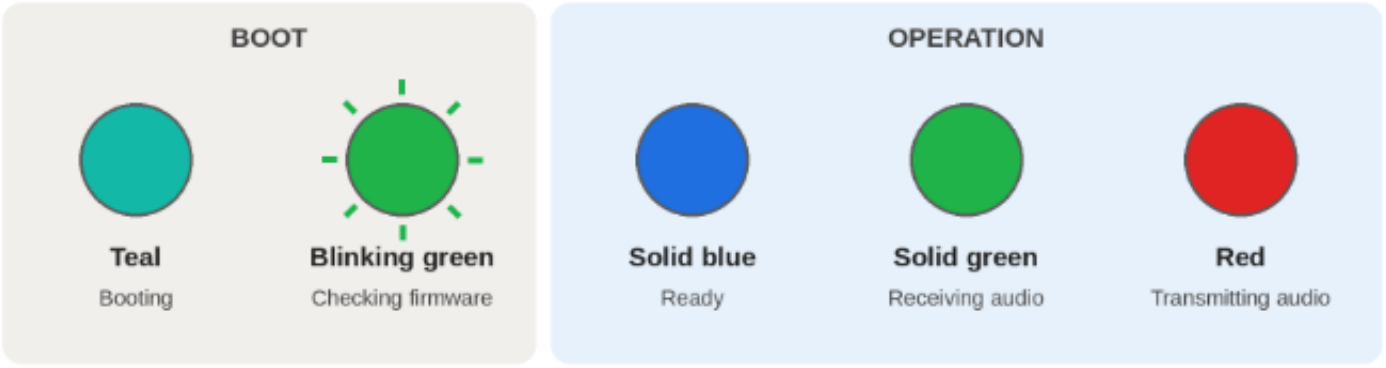
Connect the antenna, then Ethernet, then power. The Status LED turns solid blue when the payload is connected to your server.





1. **Mount the payload** for testing, either in, or adjacent to the aircraft. *Antenna placement, RF cabling and mounting hardware are the aircraft integrator's responsibility*, but care should be taken to distance the airband antenna from other RF sources. The payload uses aviation quality cable and is able to be installed as is.
2. **Connect the ground-station antenna** to the payload with the supplied coax cable.
3. **Connect Ethernet** from the payload's RJ45 port to the UAV's LAN switch or modem (Starlink, cellular, satellite or mesh).
4. **Connect clean power**, 12–30 VDC from the aircraft or ground supply, 12V recommended.
5. **Watch the Status LED** through the boot sequence below.

Status LED sequence



Phase	LED Color	Meaning
Boot	Teal	Booting
Boot	** Blinking green (green/white)	Checking firmware with the server
Operation	Solid blue	Link established, ready to use
Operation	Solid green	Receiving audio (radio to pilot)
Operation	Red	Transmitting audio (pilot to radio)

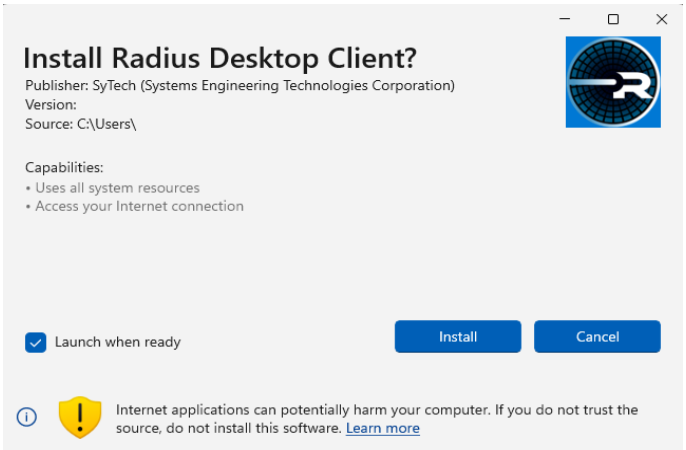
** If the LED stays blinking green, the payload cannot reach the server. Check TCP ports 7467 and 7468 are open and make sure the payload can reach the AWS server. Make sure the payload has a valid IP address for the LAN it is connected on (Step 3).

Step 1: Install the RADIUS Client

Install the client on two **Windows 11** computers with a Windows detected **microphone** and **headset** installed:

Computer	Used for
Pilot's PC	Flying: logging in and operating the AC-1 Virtual Control Head
Technician's laptop	Taken to the aircraft to set the payload's IP address, and for troubleshooting on the UAV's LAN. Laptops usually have speakers and a microphone installed which make them good trouble shooting tools.

The install also adds the Board Configuration Utility used in Step 3.



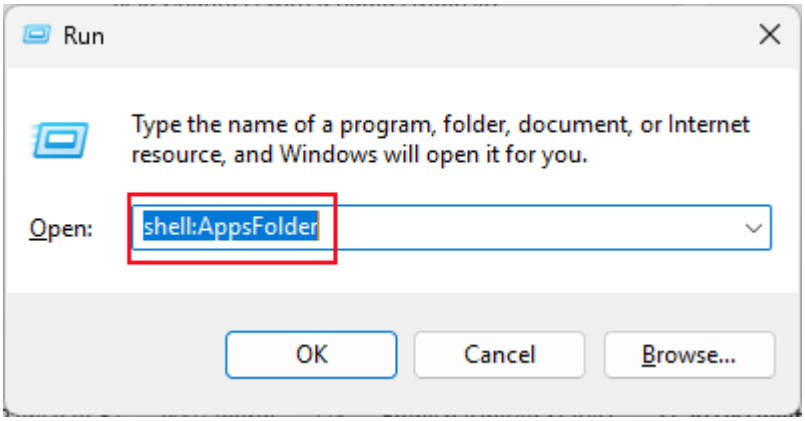
Copy the **RADIUS Setup (.MSIX)** file from the USB stick, or download it from sytechcorp.com/RADIUSsoftware.

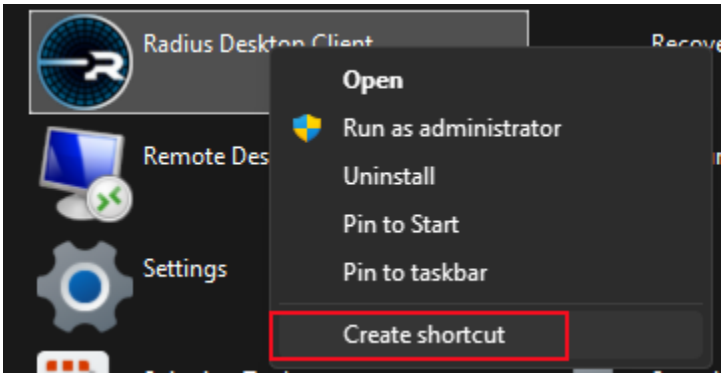
Double-click the file. Click **Install** and accept the defaults. The client launches when it finishes.

Create a desktop shortcut

MSIX installs do not create a desktop shortcut. To add one:

1. Press **Win + R**, type `shell:AppsFolder`, and press **Enter**.



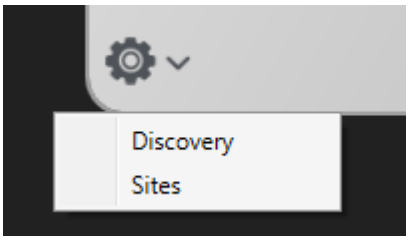


2. Right-click **Radius Desktop Client** and choose **Create shortcut**.
3. Click **Yes** when Windows offers to put it on the Desktop.

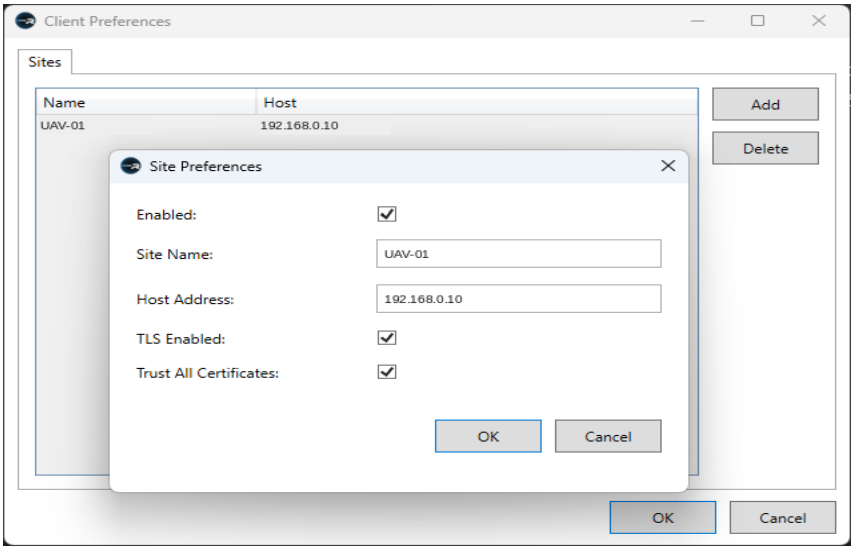
Step 2: Pilot PC - Open Client and add your site then log in



1. Launch the RADIUS Client. At the login window, click the **gear icon** (bottom left), then **Sites**.

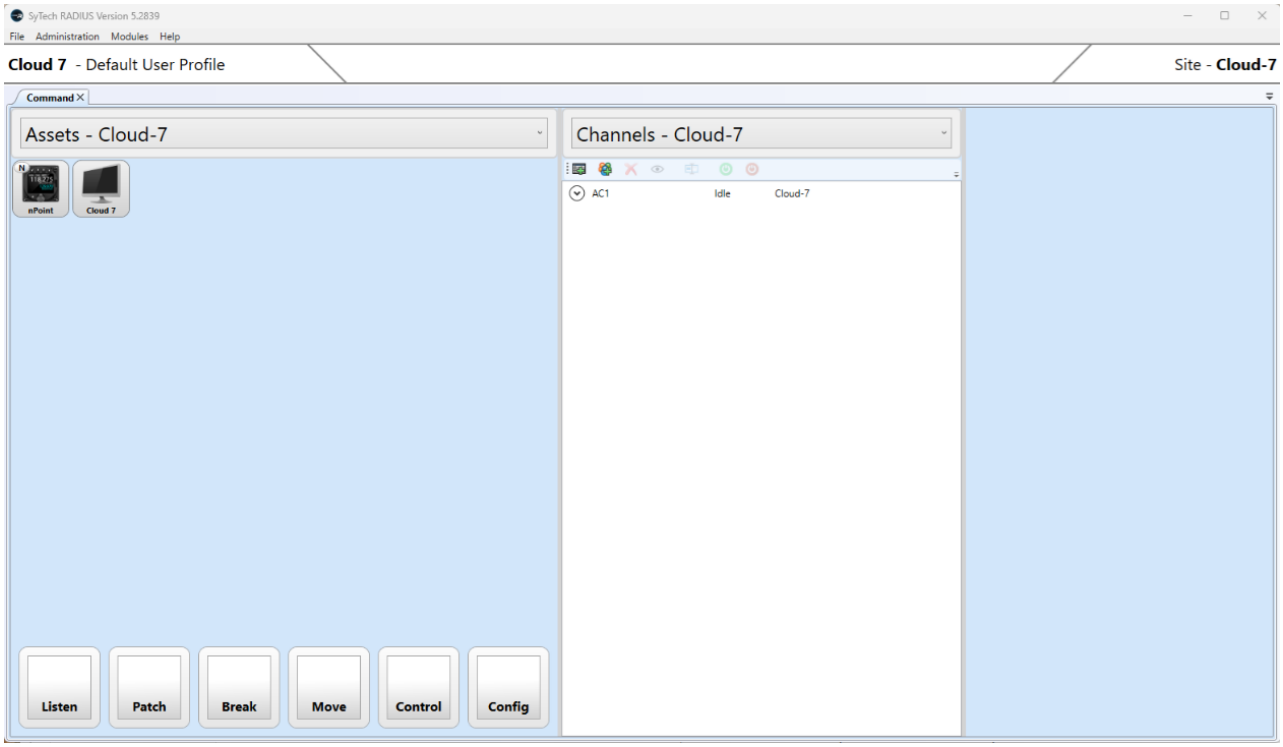


2. Click **Add**, then double-click the new entry to open **Site Preferences**.
3. Fill in the fields:
   - **Enabled** — ticked
   - **Site Name** — any name you will recognise, e.g. UAV-01
   - **Host Address** — your AWS server IP address (example: 192.168.0.10)
   - **TLS Enabled** — ticked
   - **Trust All Certificates** — ticked
4. Click **OK**, then **OK** again.





5. At the login window, choose your site from the **Site** drop-down.
6. Enter your **User ID** and **Password** given to you by SyTech, then click **Logon**, if you have internet access, you should see the image below.
7. You only add the site once, and it will be a drop-down selection for future.
8. **Optional:** to skip typing your password, when logged in successfully, go to **File → Log In Settings** and tick **Remember Username and Password**, and optionally **Auto Logon Enabled**. Restart the client to apply.

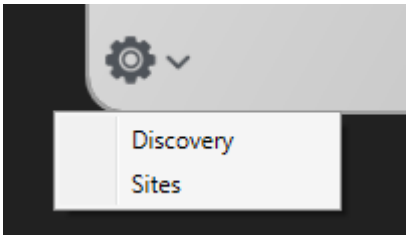


Asset may not appear until the nPoint is correctly configured.

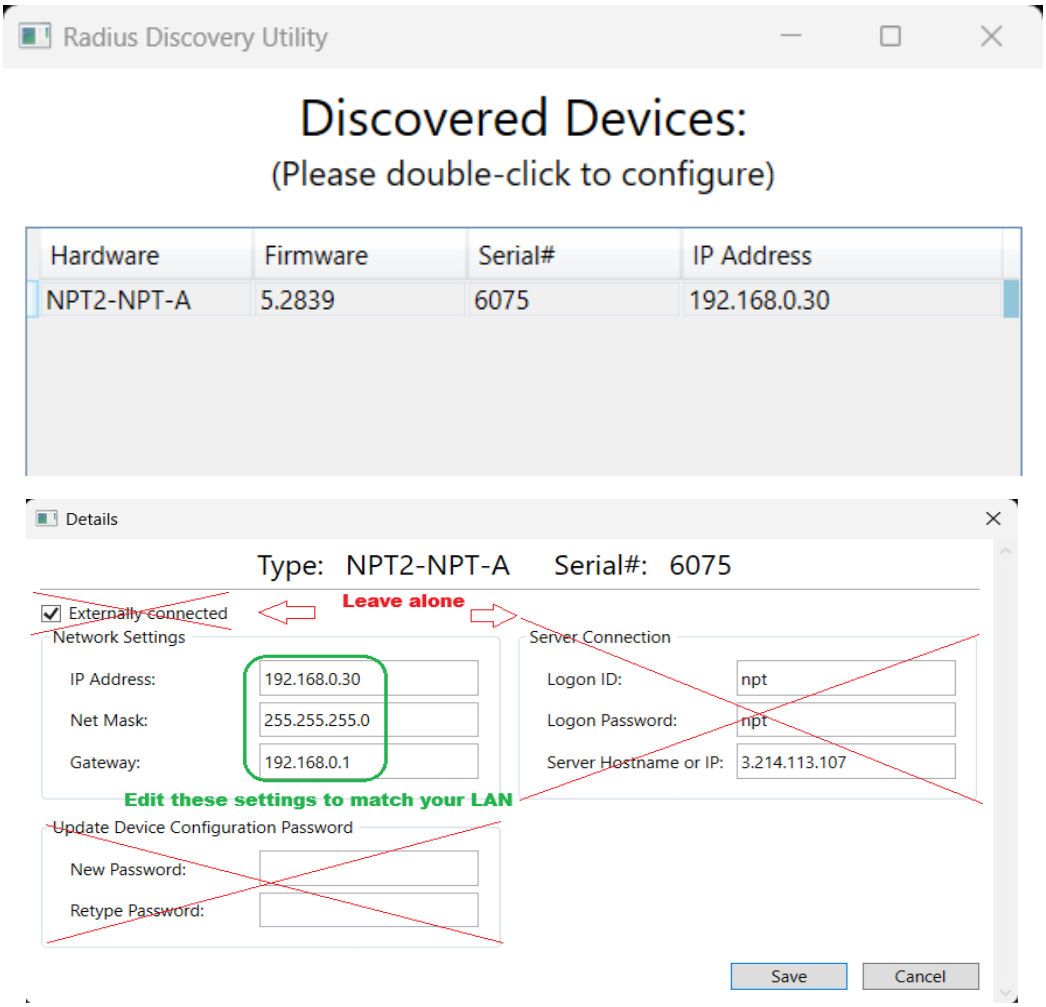
Step 3: Set the payload's IP address – Use the RADIUS Client on the Laptop to complete this setup.

> ***Connect locally.*** *Plug the setup laptop into the UAV's LAN, or directly into the payload. The utility finds the payload by broadcast, so it works whatever the laptop's own IP is. Discovery across the internet or through routers is not reliable.*

Open the Radius client **log-in screen** – before you log into the AWS server, click the gear icon and select **Discovery**.



The Discovery tool will detect the nPoint as below. Double-click the device and use password**: radius7887.**



1. **Edit** the **IP address** to give the nPoint a valid number on your UAV's network.
2. Click **Save**. The payload resets with its new address. If it does not reset, power-cycle it.

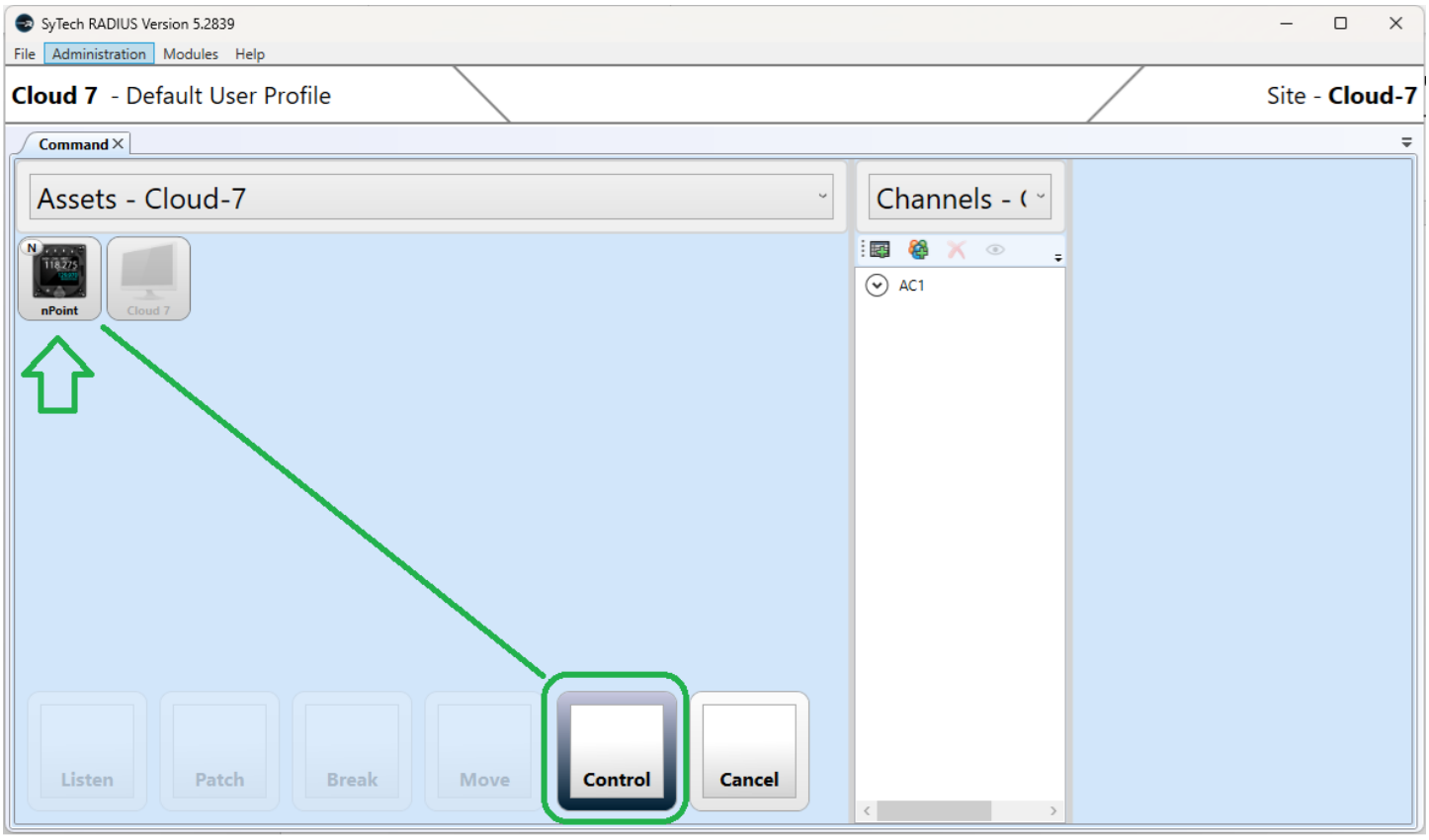
3. Watch the Link LED go **teal → blinking green → solid blue**. Solid blue means it is connected to your server. Blinking green for longer than 1 min is a sign that it can not reach the AWS server – check your ports on your routers all the way to the internet. If problems persist, test on a simple network connected to the internet.

Step 5: Operate the AC-1 Virtual Control Head

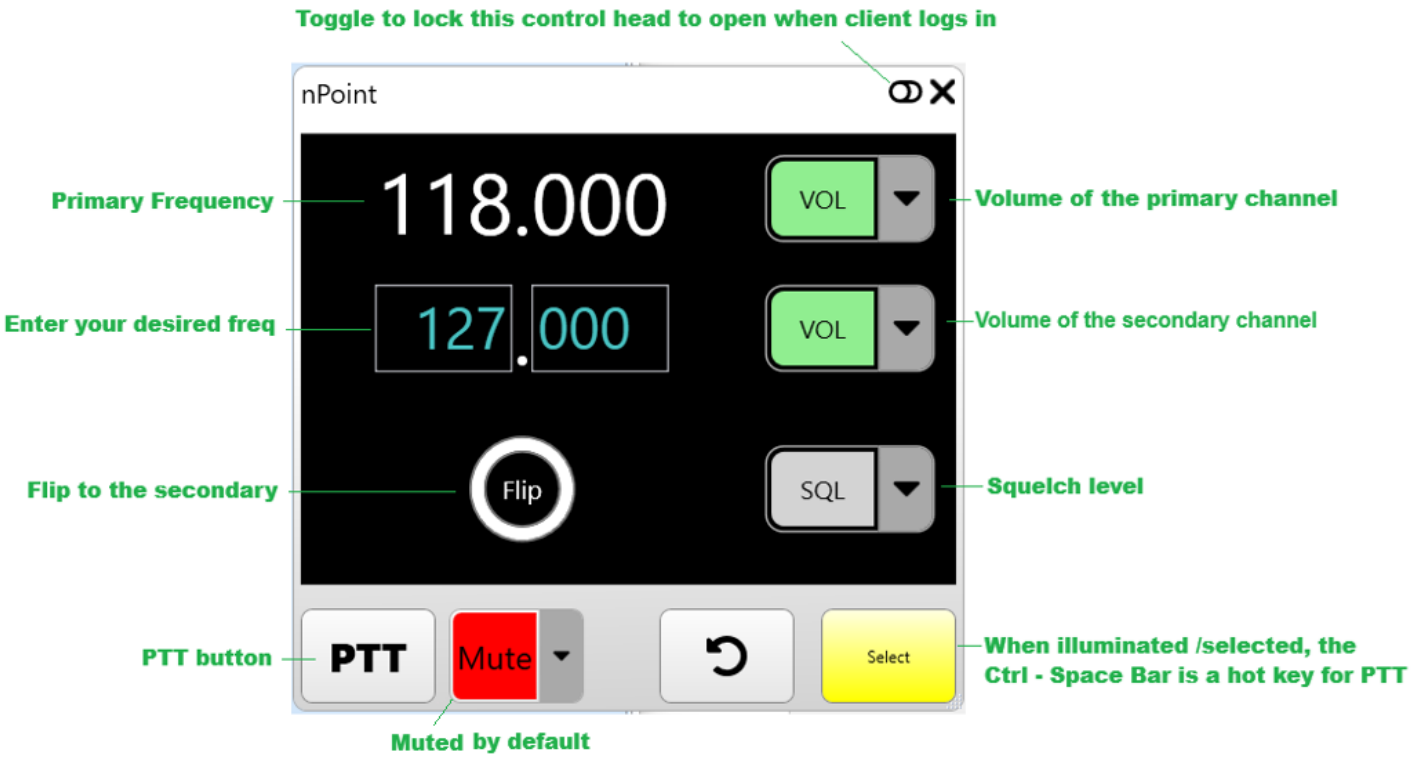


Log-on:

Log into the AWS server from either the laptop or the Pilot PC and if the install above was successful and the nPoint has a blue LED, the asset should now be visible as shown below – ready to control:



The Virtual Control Head lets you transmit, listen and change frequencies on the AC-1 from the pilot PC.



> *The control head opens **muted**. It unmutes the first time you press PTT, or when you press the Mute button.*

Check the connection **Control head** crossed **out** — the radio is not communicating with the server. See Troubleshooting.

Controls

Control	What it does
Active / standby frequency	Enter a new frequency, and transfer standby to active
Dual-watch	Monitor a second frequency alongside the active one
Main VOL slider (top)	Radio audio on the active frequency
Secondary VOL slider (lower)	Radio audio on the dual-watch frequency
SQL	Radio squelch
PTT	Press and hold to transmit
Keyboard PTT	**CTRL + Spacebar**, when **Select** is on and the head is unmuted
Speaker / Mute	Mute or unmute. The drop-down arrow sets volume and left/right balance
Instant Recall	Plays back the last transmission you received – Beta testing
Scale grip (bottom right)	Resize the control head. CTRL + mouse wheel changes the button-to-display ratio
Close (X)	Closes the control head

If the link drops

> *The system starts trying to reconnect after **10 seconds**, and keeps trying until the link returns. After **50 seconds** without a link, the control head shows a **cross** to mark the radio offline. The cross clears by itself when the link is restored.*

Keep it on top

To keep the control head above other windows, in your Radius software go to **Administration → User Preferences** and tick **Control Heads Top Most**. **Reset Control Head Positions** brings back a head that has moved off-screen. The client restarts to apply the change.

Step 6: Set audio levels

The Audio should be satisfactory with the shipped settings and if the ground antenna is assembled correctly. Should you wish to alter audio settings, start with the minimum gain settings required to pass audio and then use the volume sliders to compensate for loudness as per the starting baseline values below. Change these values one level at a time and test with a radio check.

Baseline settings

Setting	Start at
Main VOL slider (top)	about halfway
Secondary VOL slider (lower)	zero
Input gain	−10 dB
Output gain	−10 dB

Good quality audio is achieved when you have enough energy to break VOX levels but not over drive the audio power. Bad audio quality is usually a case of over driven audio, so try reduce the incoming levels from the source until the quality is tuned in. If audio quality drops badly after changes, return to the above values and start again.

Tuning your audio

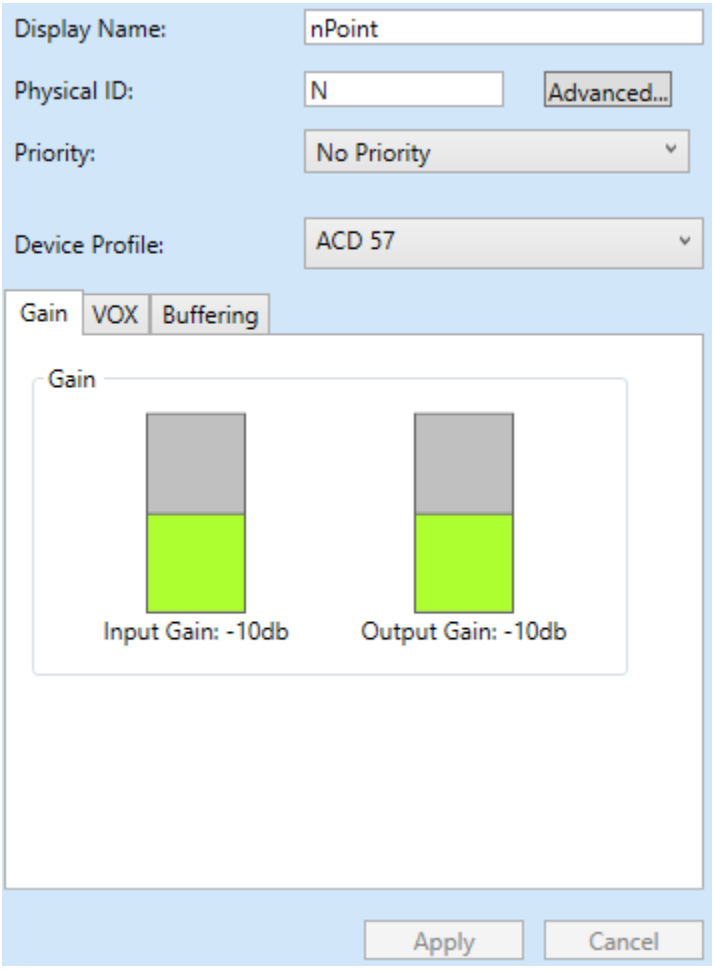
You want to change	Use this	When
How loud the Pilot's PC client is in their headset	The final volume is derived from 3 sources, the **AC-1 Main VOL slider** on the control head, the nPoint **input gain of the nPoint** and the **volume setting of Windows PC.**	Set the **main VOL slider** of the control head to **half way**, then set your **Windows PC volume** to **half way**, and use the lowest gain value (keep going down) until the audio stop coming in from a calm, non-shouting transmission, then backup a tiny amount to achieve good quality. The volume from there is up to Windows PC volume level changes.
AC-1 radio broadcast (audio quality change)	This is a combination of your **Windows PC mic level,** the nPoint **Output gain,** and the **AC-1's Mic3 input level (val=18).**	With a good headset or PTT mic close to the mouth, you should not need higher than -10dB on the output gain. Depending on the mic quality, you can change the value of the output gain to prevent over-driving. The Radio settings should never need to be altered, as they are paired with our nPoint. Note: If there seems to be stuttering/skipping audio from Pilot's PC, then try reduce the power/volume in Windows Mic or stronger output gains (more minus direction)

Adjusting the gains

Gains are named from the nPoint's point of view:

- **Input** — radio into the nPoint. This is the audio you hear.
- **Output** — nPoint out to the radio. This is your voice going over the air.

1. Inside **RADIUS** go to **Administration → Device Editor** and select the **asset/nPoint (shown as nPoint in the image)**.
2. Do not change any other settings in the asset's device settings other than gains or you may knock off the asset.
3. On the **Gain** tab, drag the **Input** or **Output** bar to the desired value. Down lowers the level (−dB = Quieter).
4. Click **Apply**. Note that the control head closes each time you change the gains, this is normal – reopen it.



> *Do not change the **VOX** or **Buffering** tabs. Device Editor needs an admin login. Day-to-day pilots can use a simpler login that hides these settings.*

Troubleshooting

Most problems are blocked ports or a wrong address. Check those first.

Symptom	Likely cause	Fix
Link LED blinks green for about 1 min then **turns off** and no other signs after that.	nPoint cannot reach the AWS server	**Check TCP 7467/7468 are open** on the UAV LAN and WAN. Check the nPoint's gateway reaches the internet and its Server Hostname or IP matches your AWS address (Step 3).
Radius Login fails: "Unable to connect to server … ApiPduSynchronizer server request has timed out"	Wrong Host Address, or the pilot PC cannot reach AWS	Check the site's Host Address matches your AWS IP (Step 4). Try to ping the AWS IP from the pilot PC.
After complete system cold boot, payload does not link.	UAV Routers booted **after** payload – payload timed out before initial link was made	Bring up the routers and network **before** booting payload
Control head shows a cross	Link lost for more than 50 seconds	Should reconnect automatically. Check the aircraft's IP link (Starlink, cellular, etc.).
nPoint not listed in the Board Configuration Utility	Setup laptop not on the same local network	Connect the laptop to the UAV LAN or directly to the payload. Discovery does not cross routers.
PTT does not transmit and flickers red when released	No microphone set in Windows	Connect a headset or microphone, set it as the Windows default input, then restart the client.
Control head open but silent	Control head muted?	Click the speaker button, or press PTT once, Mute icon changes color.
Incoming audio distorted	VOL slider or Input gain too high	Check audio tuning tips (Step 6).
ATC reports you weak or distorted	Output gain wrong	Check audio tuning tips (Step 6).
Control head missing off-screen	Window moved	Administration → User Preferences → Reset Control Head Positions.

Support

- **SyTech support:** 703-941-7887, quote "RADIUS Support"
- **RADIUS Client software:** sytechcorp.com/RADIUSsoftware
- **Documentation:** sytechcorp.com/RADIUSmoreinfo
- **Product page:** BVLOS VHF Communications for Uncrewed Aircraft
- **On the USB stick:** RADIUS Client Manual (Version 5), nPoint data sheet, AirCom AC-1 manuals