USER MANUAL

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1. PREFACE

Thank you for using the „Turbine“ plug-in. We would love to give you some important usage tips before we even get into details:

Turbines in general might take a really long time to only get to idle rpms. For instance, we have a nuclear reactor turbine in our presets, which in reality takes twenty long minutes to get from 0% to 60% (idle) rpm. You can, of course, use the plug-in in unrealistic or experimental ways; in fact, we encourage you to do so. But keep in mind that all presets might sound as small as vacuum cleaners if the THRUST gets raised too quickly. If you have a scene with a nuclear power plant starting up which is shorter than twenty minutes, do not hesitate to only use a small portion of the available 0% to 100% THRUST range rather than raising it more quickly.

Speaking of which: There is no need to always use the full range of 0% to 100%. Both are not used that much in reality. For civil planes in example 100% THRUST (or even a little above) is mostly only in use for the startup procedure. Again, please try to use only portions of the available range of rpms, this will most likely bring you to results more interesting and more usable instead of raising the THRUST quicker.

Something similar for the SIMULATOR actions:

Keep in mind what the actual speeds of the objects are that you are going to reproduce. Faster is by far not always nicer or more powerful sounding compared to slower speeds. The maximum speed or cruise speed is noted in the description within the preset browser as a reference.

Unrealistic maneuvers, for example on spot 180° turns, will result in unrealistically sounding results. Try to draw smooth flight paths and avoid abrupt and instant changes in direction or position.

There is no reverb implemented in the TURBINE. To make the turbine work in certain environments, working with the same reverb as the other sounds or another suitable reverb in a specific scenario can help a lot to smoothly blend the TURBINE into a scene.

1.1. Minimum System Requirements

Windows 7 (64-bit), 4 GB Ram, Intel® Core™ i5

Mac OS X 10.9, 4 GB Ram, Intel® Core™ i5

64-bit VST2.4 or AU host or Pro Tools 11

1.2. Installation

After downloading and opening the installer for the TURBINE plug-in please follow the on-screen instructions to install the TURBINE plug-in. Files will be copied into the common VST2.4, AU (OS X only) or Pro Tools plug-in folders on your computer. Your host should recognize the plug-in automatically with the next restart and you will be asked to register the TURBINE with your iLok account. If the host does not recognize the plug-in automatically, please follow the instructions for manual installation:

1.2.1. Windows

If your host does not recognize the plug-in, you might need to manually copy it to the host specific plug-in path. Please locate the plug-ins folder and copy the “Turbine.dll” from C:\Program Files\BOOM Interactive\Turbine to this host specific folder.

1.2.2. Mac OS X

On Mac OS X you will find the standard plug-in folders in the system library folders. The paths are as follows:

Audio Units (AU): /Library/Audio/Plug-Ins/Components

VST: /Library/Audio/Plug-Ins/VST

AAX: /Library/Application Support/Avid/Audio/Plug-Ins

AU and VST plug-ins may be placed in the user's library folders under USER/Library/Audio/Plug-Ins as well.

1.3. iLok Registration

During the first start of your host after installation, the iLok registration window pops up. The TURBINE is licensed using the iLok system. You need to have an iLok account in order to use the TURBINE, however setting up an iLok account is free on www.ilok.com. You will find all necessary information on how to setup an iLok account on www.ilok.com. To use the TURBINE, the iLok USB device containing the correct and activated license must be plugged into your host computer. A second-generation or third-generation iLok (iLok2 or iLok3) is a product of Pace that can be purchased directly from www.ilok.com or from any music retailer.
Please download the iLok Manager at www.ilok.com.
After your purchase, you automatically receive an order confirmation from us containing the download link for the installer plus a 30 numeric character long iLok activation code (i.e. 1234-1234-1234-1234-1234-1234-1234-12).

- To activate this license, open the iLok License Manager application.
- Either select the menu *Licenses -> Redeem Activation Code* or click on the small Redeem Activation Code Icon on the upper right of the application.
- You should then copy paste the entire code you received from us into the entry form. Select your iLok as the activation location to immediately activate the license on this iLok and confirm the location.
- Now you are ready to go. Here is a step by step tutorial for that: http://www.youtube.com/watch?v=1cOGCkRz5hk

2. QUICK START

Since the TURBINE produces sound rather than processing incoming audio material, in most hosts the TURBINE will be shown as a „Virtual Instrument“. This means you need to open an instrument track instead of an audio track. Select the TURBINE plug-in under virtual instruments to open it.

Note: In Pro Tools you can choose if you want to open it in a stereo/quad instrument track or stereo/quad audio track and you will find it in the *insert/multichannel plug-in/ Instrument/* folder.

Raising the THRUST on the left side will let you start-up the F/A-18 Hornet, the engine TURBINE loads on startup.

3. GUI OVERVIEW

Just in case you will not read this again, there is one basic rule to keep in mind:

Every white element in the interface is either a button, a knob or a numeric input and can be altered or pressed.

3.1. Header

The header will be the same in all views. From left to right you will find the following:

3.1.1. TURBINE | BOOM

The name of the plug-in TURBINE combined with the “BOOM Interactive“-logo will bring you to the credits, licenses and help.

3.1.2. ENGINE

Open when plug-in has been initiated. The ENGINE tab is the first you will see after opening the plug-in. Here you can change the main parameters and sonic behaviors of the selected turbine engine.

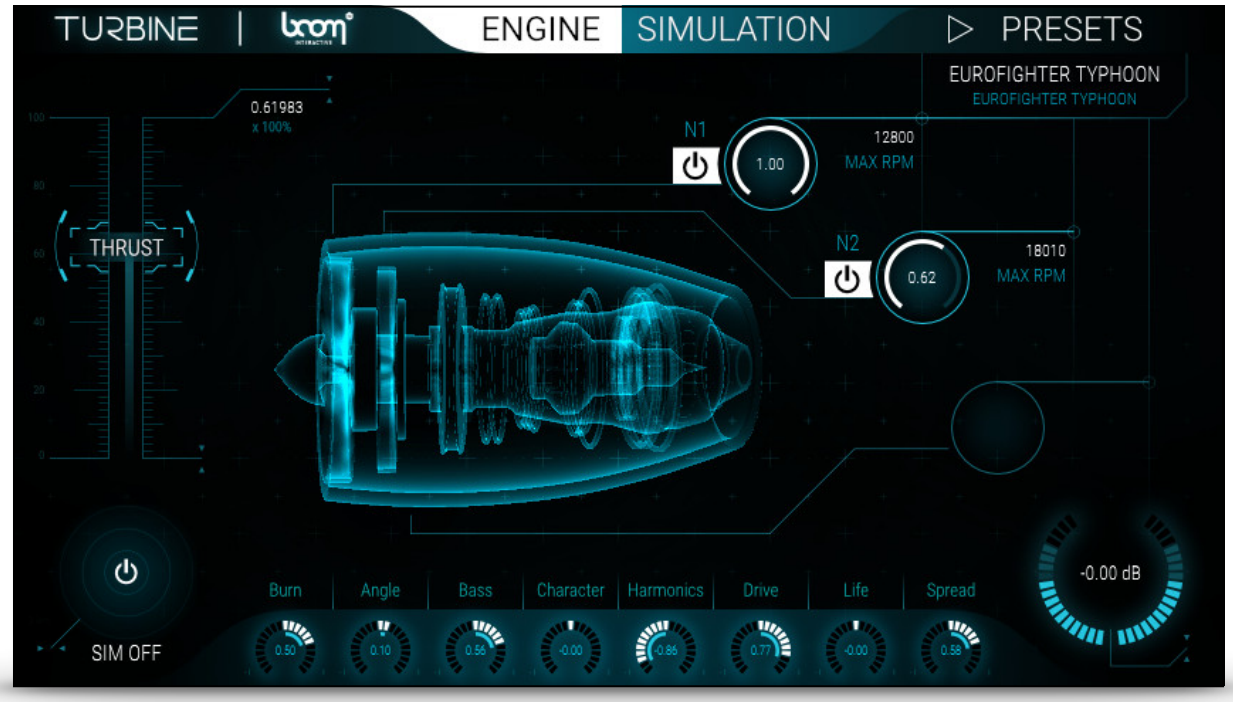
3.1.3. SIMULATION

Clicking on SIMULATION will bring you to the SIMULATION tab with all the parameters you can change for the ENGINE in motion.

3.1.4. PRESETS

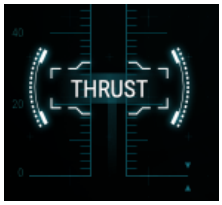
The PRESETS allows you to load various different airplane engine models as well as industrial turbines or other presets, such as vacuum cleaners, turbine starters, rockets etc.

3.2. ENGINE



When the plug-in has been opened, the ENGINE tab will be shown. The following parameters are available:

3.2.1. THRUST



The large THRUST lever on the far left lets you control the rpm of the engine. At 0 % THRUST, there will be no output. The highest maximal value is 100%. You can either control it via the lever, or entering numeric values in per cent x 100 on the upper right side of the THRUST lever.

3.2.2. SIM ON / OFF

The little radar on the bottom left corner of the interface lets you not only activate or deactivate the simulation page, it also gives you an idea of the movement if the simulation is turned on but you are still on the ENGINE tab. Each circle represents one kilometer distance to the listener position (3 circles x 1km = 3km radius = 6km diameter!).

3.2.3. SOUND CONTROLS

On the bottom of the interface you will find eight knobs, ranging from minus 1 to plus 1. They control the sound character of the engine as follows:

3.2.3.1. BURN

This determines how much fuel is given into the combustion chamber. If the turbine has afterburn, BURN will get very aggressive when turned up to 1. Note that by far not all airplanes and of course no none-plane turbines have an afterburner.

3.2.3.2. ANGLE

Changing the listener perspective or the angle relative to the engine changes the sound. In general it mostly results in a more tonal sonic character when the engine is turned towards a front view (ANGLE is turned to the right toward plus 1) and a noisier sonic character when the listener moves to the back of the engine (ANGLE is turned to the left towards minus 1). Even though not represented visually, plus 1 (right) equals a 90° turn to the front, which means the listener's position is in front of the engine, whereas minus 1 (left) equals a 90° turn to the back, which means the listener is positioned at the back of the engine. You can simulate full 360° cycles by going from centered 0 to minus 1, then to plus 1 and back to the centered 0.

3.2.3.3. BASS

Adds low end for a more rumbling sound. This is specifically useful to get more variations during the SIMULATION, but also can beef up the close up view when SIMULATION is turned off.

3.2.3.4. CHARACTER

The CHARACTER can alter different things. If not stated otherwise in the PRESET-Description, CHARACTER alters the strength of resonances which mostly occur when the engine is on load. Some presets use CHARACTER to alter the general or other sonic behavior of the engine as explained in the PRESET-Description.

3.2.3.5. HARMONICS

Adds or subtracts overtones of only the tonal components of the engine.

3.2.3.6. DRIVE

Adds or subtracts distortion.

3.2.3.7. LIFE

With LIFE you can push or lower the strength of the modulation within the engine. More LIFE can be more interesting, especially for longer scenes at static rpm values, whereas for more modern, technologically advanced sound characters or for creating loops it may help to flatten natural modulations.

3.2.3.8. SPREAD

Alters the stereo width of the engine. This function has no effect during the SIMULATION. Experiment as to what suits your needs best. A good way to get a stereo feel might be to set the spread to minus 1 = mono and use reverb instead of spreading the TURBINE too wide.

3.2.4. N1, N2, N3

The TURBINE features three stages: Low pressure, intermediate pressure and high pressure. Altering those parameters can drastically impact the behavior of the engine, letting you create completely new and most likely non-existent engines. Not all turbines have more than one stage, only a few have three stages. If a stage is not used in a preset, it is disabled and cannot be activated.

3.2.4.1. Nx On / Off

The power knob just below each of the stages Nx lets you activate or deactivate the respective stage. This alone will result in a very different sonic character of the engine.

3.2.4.2. Nx VOLUME

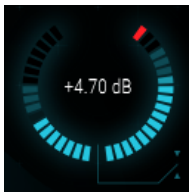
The circle with the initial 1.00 lets you create new “mixes” of the stages by lowering the volume of one or more stages.

3.2.4.3. Nx MAX RPM

Again, something that drastically changes the sonic behavior: For instance, you can let N2 rise faster with higher THRUST levels or – if the relations are kept – simply change the highest tone at 100% THRUST. Keep in mind: lowering or raising these MAX RPMs in a stage is absolutely not the same as using different “Thrust” settings. For example: 50% THRUST of a preset will sound completely different compared to dividing all MAX RPMs by two and pushing the THRUST to a 100%.

3.2.5. METER

The METER on the lower right corner of the interface shows the RMS volume of the plug-in in dB. The red light indicates, that the soft clipper is active (see VOLUME), starting at minus 3 dB. So red does not mean clipping, but rather more saturation / distortion.



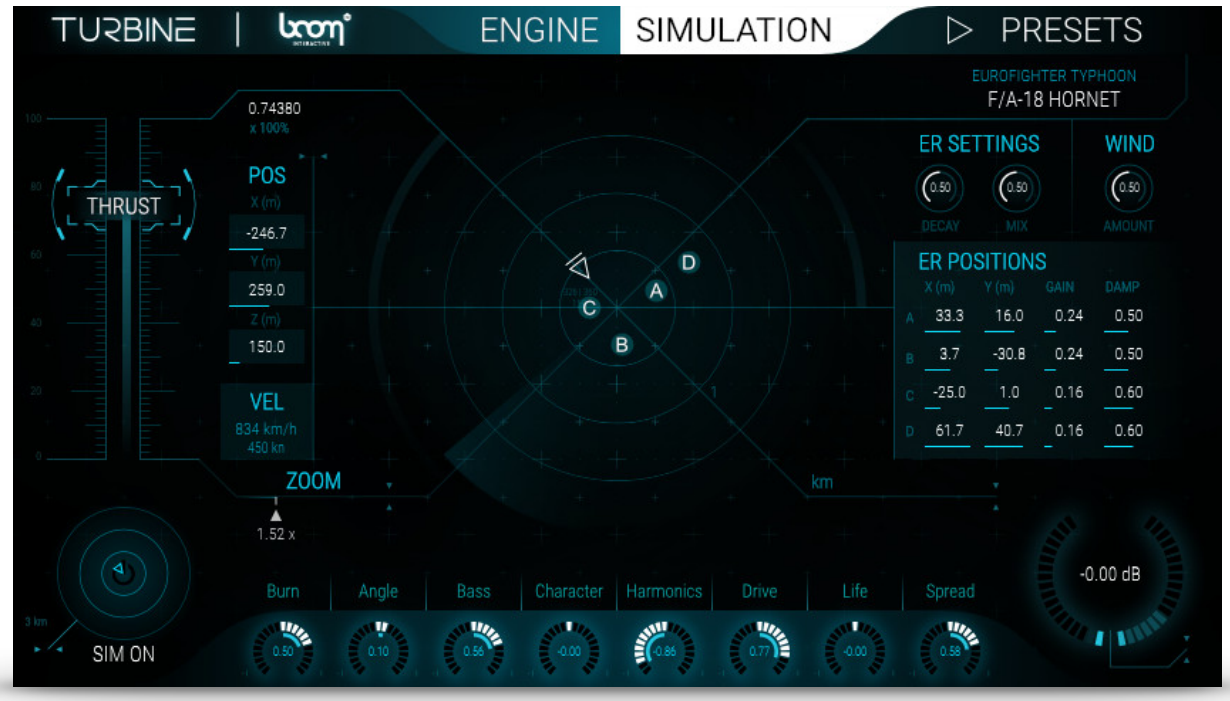
3.2.6. VOLUME

The TURBINE features a soft clipper before any audio goes into the channel of your host. The VOLUME lets you alter the output PRE(!) soft clipper. You can lower the VOLUME in dB to get a more dynamic and with some presets less aggressive sound. But you can also add extra gain pre soft clipper to get a denser and more distorted sound.

3.2.7. PRESET NAMES

In the upper right corner, just below the PRESETS button you can see which presets are currently selected for both the “ENGINE” page and the SIMULATION page. Depending on which tab is selected (currently the ENGINE tab), the preset of either the ENGINE (upper text) or the SIMULATION (lower text) will be highlighted.

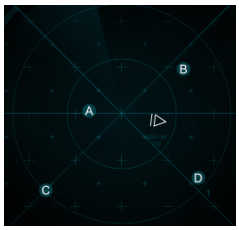
3.3. SIMULATION



The SIMULATION page shares a lot of controls with the ENGINE page. However the most significant element here is the big radar at the center of the screen.

Note: You will encounter a delay within the SIMULATION. This is due to the math needed to resynthesize the flight path on the spectral domain to get natural flight behavior.

3.3.1. RADAR



In the center of the interface you can see a big radar screen. When the SIMULATION is running a scanner circles around the radar (to activate and deactivate the SIMULATION use the small radar button on the lower left corner). By default, zoom (3x), the outer radar line is at a 1km distance.

The white triangle shows the current position of the engine. To write automation for flight paths, you can grab the triangle and move it around by holding the left mouse button pressed. As soon as you move the engine around in space, you will see several parameters changing on the left side of the radar.

3.3.2. POS (Position)

On the left side of the radar you will find the current X / Y / Z positions of the engine in meters in relation to the centered listener position. You can numerically input those values as long as no automation overwrites it. Abrupt changes in direction or position of the engine in the environment might result in weird sonic outputs.

3.3.3. VEL (Velocity, Speed)

The speed of the engine within the simulated space will be displayed here when the engine is in motion. Whenever you fly around, please make sure to have reasonable speeds or expect rather experimental outcomes (which is fine if it suits your needs of course). The display shows kilometers per hour (km/h) and knots.

3.3.4. ZOOM

You can zoom the main radar in the middle of the interface to get more control up to factor 3x. If fully zoomed in, the outer line of the radar will be 1km. At zoom factor 1x, the outer line will show distance of 3km.

3.3.5. White Dot and White Arrow

Will only be shown when the engine is out of the visible radar zoom to give you some indication of where the engine is located. You can still grab the white dot and move it around back into the visible radar.

3.3.6. ER SETTINGS

ER = Early Reflections, whereby “early” in these dimensions is pretty far away compared to studio reverbs. There are four sound reflecting obstacles that can help to get a better sense of the engine’s position during movement and to create a more natural environment. You can alter the settings of those in several ways. These ERs basically work like delays which you can place in the room.

3.3.6.1. ER DECAY

The feedback of the ERs. Be aware that each ER only bounces off of the other ERs, so feedback does not mean each ER feedbacks itself. You rather set the material the reflecting surfaces are made of, determining how reflective they really are.

3.3.6.2. ER MIX

Allows you to change the mix of the ERs compared to the original, dry engine output.

3.3.6.3. ER POSITIONS

You can alter the X and Y coordinates in meters for each of the four reflective obstacles as well as the gain and damping. The maximum distance of each ER is a bit less than 100m (X=70m, Y=70m). You can also change the position of the obstacles within the radar. Simply left click and hold one of the ERs A, B, C or D and move it around. Please note that the ERs distance to the viewer is the actual radar distance divided by ten. ERs in the radar might be closer than they appear!

3.3.6.4. ER GAIN

It is possible to mix the ERs differently. In most scenarios, the further away one ER is, the less gain you want to set here. But, of course, this is a matter taste.

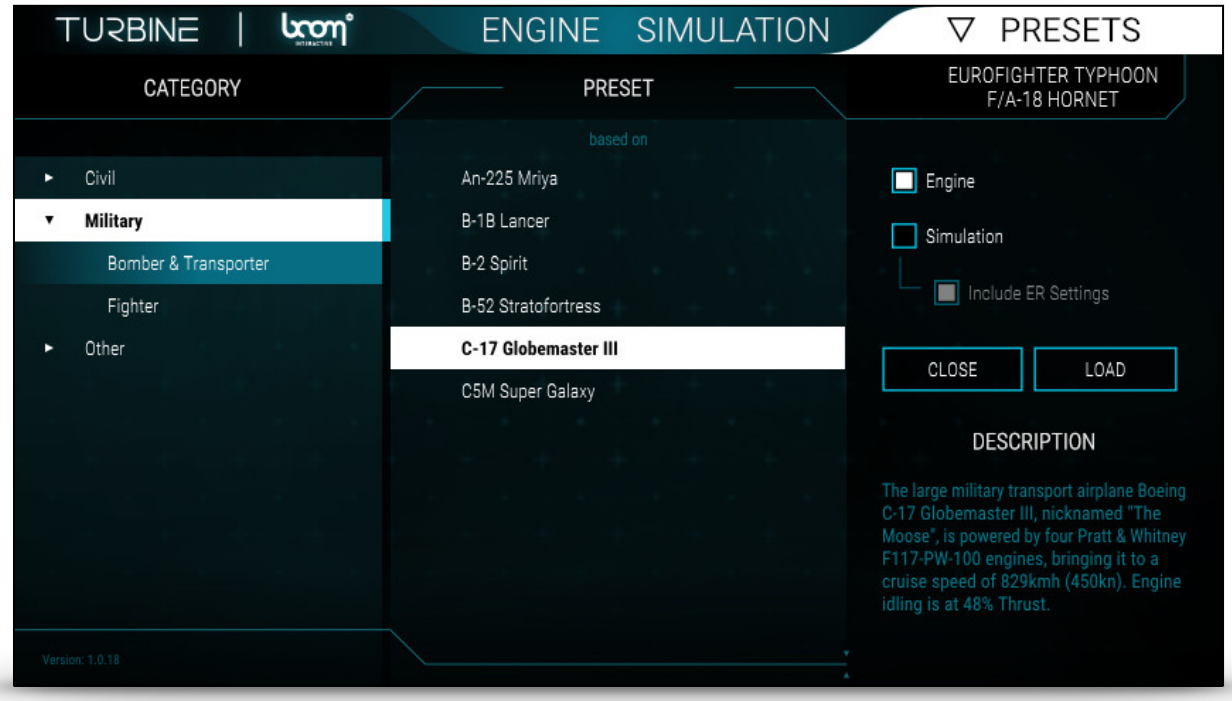
3.3.6.5. ER DAMP

It is also possible to alter the individual feedback behavior independently from the general ER DECAY parameter. ER DAMP in combination with ER GAIN can simulate different materials or sizes of each of the four ERs A, B, C and D.

3.3.6.6. WIND

To the right of the ER DECAY and ER MIX settings you will find another parameter, called WIND. This lets you lower or strengthen the Lorenz-attractors that result in wind modulation of the engine in the simulated space.

3.4. PRESETS



The PRESETS browser allows you to browse through categories and load either an ENGINE or SIMULATION setting or both simultaneously.

Chose a CATEGORY and Sub-CATEGORY first, then select a PRESET. There is always a description to give you an idea of the preset as well as tips for special content. On the right, you can choose if you want to load the ENGINE and SIMULATION parameters combined, which is the recommended way to get coherent results.

To get more diverse or even experimental you can also select a PRESET and load the parameters of the SIMULATION only to combine these with the currently loaded ENGINE or the other way around. If you already set the ERs corresponding to the environment you need the SIMULATION to take place in, you can exclude or include the preset's ER SETTINGS.

The status of what is currently being loaded can be seen at the upper right corner of the PRESET page. ENG stands for ENGINE and SIM for SIMULATION.

4. TIPS AND TRICKS

4.1. GENERAL

4.1.1. SMOOTH BEHAVIOR VS. AUDIBLE STEPS

To achieve the smoothest sound behavior, use automation instead of mouse inputs. The resolution of automation is much higher compared to mouse inputs. When you first start raising the THRUST via mouse input and you hear steps, this is not because the resolution within the TURBINE is not high enough, it simply is because the resolution of the mouse input is not high enough and you should use automation instead.

4.2. ENGINE

4.2.1. STARTUP SPEED

It cannot be emphasized enough: The majority of largeness comes from the speed a turbine starts. A vacuum cleaner or hair dryer will be at full THRUST within seconds, reaching up to and above 100,000 rpm. There is no plane turbine engine that will even reach such a high rpm count. Use the THRUST lever with caution.

As a basic rule: a fighter jet engine start-up from 0 rpm to idle which is mostly around 50 % to 60 % THRUST will take between 30 and 60 seconds. If your scene is shorter, try to use the same start-up speed but less range of the THRUST.

To test a slow power-up or down, you can drag one of the decimal points of the THRUST value up or down. The smaller the decimal point, the more precise and smooth the sound will be.

4.2.2. DESCRIPTION

Read the preset description carefully, especially for the CHARACTER parameter there sometimes are interesting sound shaping possibilities. If resonances can be altered, the reason mostly is that the resonances only occur on load, for example during start-up, but not off-load (during wind down).

4.2.3. ANGLE

The ANGLE parameter is independent from the angle within the SIMULATOR, so you can use this to generally alter the timbre of the sound.

4.2.4. ENVIRONMENT

Reverb helps to blend the TURBINE into a given scenario. When the SIMULATOR is not running, you basically hear the ENGINE at virtually zero distance in an anechoic chamber. Adding third party delays and / or reverb to put this engine into an environment will help to mix it into a scenario.

4.2.5. PROCESSING

In general: Feel free to add more distortion with third party plug-ins, use EQs to further shape the sound, let the TURBINE stutter with tremolators, experiment with the audio output in all ways you would do with real recordings. Jet engines you hear on YouTube for example are highly compressed / limited ultimately distorted because of the devices they are recorded with. It is easy to get this impression with some distortion and plenty of limiting. What is offered in this plug-in is a turbine sound as clean as it can get.

4.2.6. On-Load vs. Off-Load

Yes, an airplane engine has this as well. In all presets BURN at the initial center position zero is an average value. If you want to raise the THRUST, push the BURN first a bit and then dial it back to a little above zero. Before you lower THRUST you might want to lower BURN to below zero, to get a nice and less powerful / noisy wind down.

4.2.7. Starting multiple engines

The B52 super fortress, a huge beast of a flying machine, has eight engines under its wings to give an example. In reality they all start one after another and not simultaneously. The same actually applies to planes with only two engines. If you really need this, you can certainly instantiate several TURBINE plug-ins to get the correct start-up procedure. We would then recommend to lower the SPREAD and rather pan the instrument tracks. For as much as eight engines, you might want to go completely mono and melt them together with some third party outdoor reverb / delays.

4.3. SIMULATION

4.3.1. MOVEMENT SPEED

At the risk of repeatedly repeating ourselves, faster is not always better or more powerful. Always keep realistic speeds in mind (see PRESET descriptions), or at least speeds that make sense in your scene.

4.3.2. ALTERING SPEED

Let's say your plane moves from the far left to the far right at a constant distance of 250 meters in front of you at 250m height at a constant 500km/h speed. Now you think this is boring and you want to alter the speed, but the X coordinates suit the scene perfectly. There are two ways:

- Set an automation point at the closest spot on the Y or Z axis and raise the distance of one of them for the far left and far right position. The result will be that the engine has to cover a larger distance to be at the same position at the closest spot.
- You have set a full X / Y complicated flight path which you really like. Now you are not satisfied with the speed. You can use the Z axis in the same way to alter the speed without touching the X / Y coordinate automation.

4.3.3. MORE MODULATION

We implemented a pretty complicated and – in a positive and natural sense - chaotic wind modulation based on the Lorenz system. However, this might still sound boring. Partly because not only the wind alters the sound of a moving airplane. What probably all of you know is the sound of an approaching airplane, ready to touch down on an airfield. There might be a constant wind up and wind down depending on the situation. Use the THRUST and automate it on top of the movement simulation to get more modulation into it.

But that is by far not everything you can do. Try to automate all those parameters at your disposal within the TURBINE, remove bass when the plane approaches and add bass when it passed the listener position. Give it more or less tonal elements during a pass using the ANGLE, alter the mixes of the stages Nx to get the well-known wobbling effect. Simply put: go wild with automation if needed.

Or possibly you want something more controllable? Then set the WIND on the SIMULATION page to zero, lower the LIFE parameter to minus 1, do not automate any other parameters except X / Y / Z parameters.

4.3.4. DELAY / SMOOTHING VALUES

As mentioned before, there are several parameters to calculate mathematically only after it happened which results in the speed, distance, position (X / Y / Z), Doppler status and direction and a natural acoustic behavior of the ENGINE in motion. This smoothing takes 500ms. This is no latency, this smoothing is needed in order to avoid unrealistic acoustic behavior. Especially when you are working with picture, you should start the flight path

about a second before it appears in the picture so that the TURBINE has time to calculate speed within the SIMULATION. Simply use track volume automation to fade in and fade out as needed for the picture.

4.4. HOST SPECIFIC

4.4.1. LOGIC

4.4.1.1. TURBINE FADES OUT

In Logic the instrument tracks behave a bit different compared to other hosts. When you select a track without a TURBINE on it and hit stop after playing back or recording, the tracks with active TURBINES will fade out to minus infinite dB until you play back again. When a track with a TURBINE active is selected and you hit stop, this specific TURBINE will still make sound even after you hit stop.

4.4.2. PRO TOOLS

4.4.2.1. TURBINE NOT AVAILABLE

In Pro Tools you can use the TURBINE on either an instrument track or an audio track. However, these tracks must be stereo (or quad) tracks in order to show the TURBINE in you plug-ins. You will find it in the *insert/multichannel plug-in/Instrument/* folder when inserts are sorted by categories or in the *insert/multichannel plug-in/BOOM Interactive/* folder when inserts are sorted by manufacturer.

5. POSTFACE

5.1. Final Thoughts

We used several terms related to the engine in a more commonly understandable way instead of a fully technically correct sense. Some examples:

A turbine is in fact only a small part of the engine; there are also one or more fans, several compressors and the combustion chamber.

We also always use a 100% Thrust as a maximum. In fact, our 100% is already the maximum rpm the specific engine on a specific airplane can reach. Normally an engine can stand more than 100% rpm for a short amount of time (often around two minutes), for example for starts. Assuming this is 104% for one spool, this equals 100% THRUST in our plug-in.

Not even the percentages you see in our plug-in might be entirely correct. In reality the shafts do not wind up at the same speed and possibly do not have the same rpm at any given moment plus the shaft speeds are often independently controllable by the pilot. If you need more specific results, you can always use TURBINE plug-ins, mute N2 on the first one and N1 on the second one using the same PRESET and control them individually. But remember, the shafts Nx in the Turbine do not necessarily rise in a linear way.

There are four main types of gas turbine engines and we reproduce two of them: Turbofan and turbojet engines.

We tried very hard to make a highly advanced technical topic as easy to use and easy to understand as possible. This means, if you are a real gas turbine geek, you will find things that technically are not perfectly accurate. Feel free to contact us; I am confident that we have thought about it and exchanged correctness for usability on purpose. Also feel free to contact us for custom engine sound design. We are always open for that.

Lastly, here are some thoughts on you can use the TURBINE (just some examples where turbine sounds have been used in the past):

- You can create some nice whooshes for general use and highlights in totally non-turbine related situations using the SIMULATION.
- Check out science fiction vehicles, wheeled or winged. Most likely you will hear turbine sounds at least as a layer.
- Any car can be accelerated with turbine sounds, simulating a super charger.
- Robots' movements, small and large, can be supported with turbine sounds.
- Current or future machinery in general.
- Room tones can be created with the industrial turbines (or any other suitable engine).
- Remember the famous race one of the biggest SciFi franchises? Most of those vehicles are combinations of turbine recordings and a wild combination of other sound sets.
- All kinds of spaceships are great with some support of turbine-ish sounds.
- Trailer music, trailer rises, trailer highlights – a very typical scenario to use rising turbine material.

We hope you have a lot of fun using this plug-in and produce some amazing sounds for mind blowing productions.

Sincerely yours,

The BOOM Interactive Team

5.2. End-User License Agreement

BOOM Library GbR grants you a revocable, non-exclusive, non-transferable license to download, install and use the TURBINE for personal and commercial use in accordance with the terms of this Agreement.

You agree not to, and you will not permit others to: (a) decompile, reverse engineer, disassemble, attempt to derive the source code of, or decrypt the TURBINE; (b) make any modification, adaption, improvement, enhancement, translation or derivative work from the TURBINE; (c) violate any applicable laws, rules or regulations in connection with your access or use of the TURBINE; (c) remove, alter or obscure any proprietary notice (including any notice of copyright or trademark) of BOOM Library GbR or its affiliates, partners, suppliers or the licensors of the TURBINE; (e) make the TURBINE available over a network or other environment permitting access or use by multiple machines or users at the same time; (f) license, sell, rent, lease, assign, distribute, transmit, host, outsource, disclose or otherwise commercially exploit the TURBINE in ways other than permitted in this Agreement.

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