Flux IRCAM SPAT

ROB JAMES discovers a multiformat room acoustics simulation and localisation package that is quite unlike any other.

Paris based IRCAM, L'Institut de Recherche et Co-ordination Acoustique/Musique, was founded by Pierre Boulez at the behest of president Georges Pompidou. The institute opened in 1977 at the Richard Rogers-designed exoskeletal temple of modern art, the Pompidou Centre.

Since its inception, IRCAM has been at the forefront of highly academic and mathematically complex research within the fields of musical expression, musical research, sound, and acoustics. Leaving aside a mass of other achievements, the LISP-based object-oriented visual programming environment for musical composition and the computer-aided orchestration tool Orchidée, built with MATLAB, are notable IRCAM successes. There have been previous collaborations with third party developers including Cycling 74, and now there is Flux.

The fruit of the Flux collaboration is a series of unusual and fascinating processors, the first of which is SPAT, a multiformat room acoustics simulator and localiser (Euro 1399 for SPAT and Verb). Installation is easy and the plug-in works in 32-bit and 64-bit PC environments on Windows XP, Vista and 7 as a VST plug-in. On Macs it is 32-bit currently and works on OSX 10.4, 10.5 and 10.6 as a VST, AU or RTAS (On Pro Tools 7 or later) plug-in. Licensing uses an iLok dongle or one of Flux's own. Internal processing is 64-bit floating point. Sample rates up to 384kHz are supported including the Merging Technologies DXD format used for mixing DSD material on Pyramix systems.

Signal flow works like this. 'Physical' input channels are mapped to one or several virtual 'Sources' that are placed in a three-dimensional virtual acoustic space. Sources and virtual loudspeakers can be moved within the space with adjustable perceptual and acoustic parameters such as Source Presence, Warmth and Brilliance, Room Presence, Running Reverb and Envelop. Distance, Azimuth, Yaw, Elevation, Pitch and Aperture alter the localisation.

There are three reverb engines that allow for the creation of complex spaces with coupled room acoustics. Output can be anything from stereo to eight channels. The output can also be encoded into various surround, ambisonic and other formats although confusingly this is set under a list headed 'Output Decoding'.

The user interface is arranged as three tabbed pages — Source, Reverb and Setup. Input, Source and Output mappings are made in the Setup page, Source

parameters are adjusted and visualised per source in Source and Acoustic Space parameters adjusted and visualised per reverb engine in Reverb.

The controls on offer for editing Source and Room Acoustic Simulation parameters are a set of so called 'Perceptual Factors' such as Source Presence, Source Warmth and Source Brilliance, Reverberance, Heaviness and Liveness, which, Flux says, correspond to 'real-world criteria in terms of hearing perception'. This is the result of extensive R&D at IRCAM and Flux to produce a meaningful relationship between these criteria and the multitude of adjustable parameters under the hood. A 'Perceptual Mapper' translates between these Perceptual Factor controls and the much larger set of internal algorithm parameters. Apart from the Perceptual Parameter controls there is a raft of others, far too many to detail here.

Sources can be toggled on/off individually and can also be soloed. Output routing is expressed in terms of loudspeakers. You can change the appearance from universally dark to somewhat lighter in some panes using a global switch with sun and moon symbols under the Flux logo. Since label text is grey the darker version offers better legibility. Also under the Flux logo a less than obvious button with a two meshed gear icon is where you choose the number of 'physical' input and output channels and set latency and other options.

In addition to the more exotic parameter displays there is an Acoustical Criteria pane that shows the settings in terms such as RT60, familiar to more technically savvy users.

Like all Flux plug-ins SPAT has a very useful dual preset system with separate Save and Recall for A and B sets of parameters. A long horizontal slider enables morphing between parameter sets. This can, of course, be automated and applications are many and various. For example, automating the change in effect as a character walks between different acoustic environments while speaking. Three sets of presets are managed directly, Factory, User and Global. The Factory presets are limited at present with just 11 examples included. Factory presets are locked but copies can be saved and modified subsequently to produce new User or Global presets.

This is a plug-in with universal appeal but the sheer number of parameters is bewildering and the user manual doesn't help. Although it says: '… the complexities of the reverb algorithm are hidden from the user so one can make predictable and guided adjustments instead of having to resort to a "poke in the dark" approach…' the truth is that most people will be groping about trying random adjustments in the hope of achieving something desirable. The factory presets demonstrate that spectacular results can be achieved and cautious tweaking gives hints of what this plug-in is capable of but it needs a vastly increased number of presets and an explanation in the User
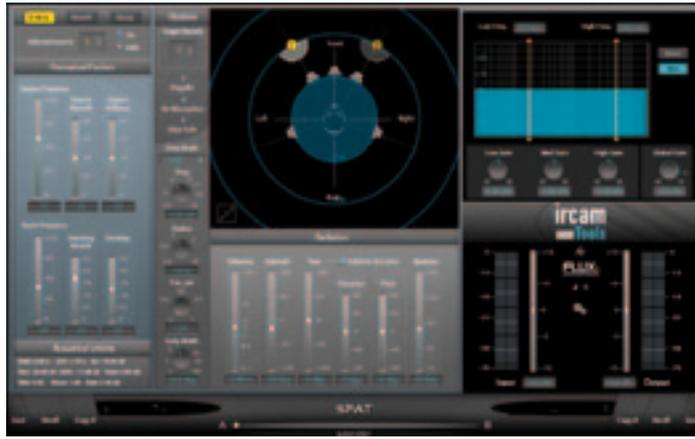
Manual of what to tweak to achieve specific goals.

I'm sure it is all terribly obvious to the developers but it isn't to me and I play with this kind of stuff all the time. The more complex the processor, the greater the need to dot every 'i' and cross every 't' when explaining it to the rest of us.

The saving grace of this plug-in is the sounds it can produce. Unique is a much over used word but appropriate in this case. SPAT is capable of locating sounds in an environment in a way that I have never heard previously. As a simple room simulator it is up there with the very best.

In many real-world applications, for example in sound for picture, this means that, leaving aside the reverb possibilities, most importantly SPAT enables you to locate and/or match a close miked recording of an actor or effect anywhere in the sound stage in a realistic environment, at a distance or locally. This is something of a 'holy grail' among post folk. Similarly, you can pan that actor or effect as required and automate all the parameters involved. The same applies to spot mics in music recordings. SPAT enables you to locate sources anywhere in the sound stage with a hitherto unknown accuracy. All this is achieved by algorithmic means. There is no convolution component here, just 20 years of research at IRCAM. Of course, this can also be used to create entirely bogus environments for film, post, games or music.

In the games arena SPAT will be especially valuable since it enables so much dynamic control over location and panning. Voices and effects can follow the action not only in simple level but distance and orientation. And by orientation I mean the direction the source is emanating from, not simply its position. So, when a character is shouting into the wilderness away from the focus, the sound will be different to when the character turns to face the POV. Of course, the same tricks can also be used in film.

All these effects will currently require a lot of experimentation and hard work. I think the results are worth it.

SPAT is a quantum leap forward in algorithmic localisation/room simulation plug-ins. Despite the interface and user manual shortcomings it is still on the must-have list of any serious postproduction or games sound designer prepared to invest time in learning and tweaking. ■

PROS	It's very Gallic; unique sounds; excellent room simulator; clever localisation.
CONS	Complicated and often not clear user interface; poor documentation.

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