

LIVE PRODUCTION

SPAT

REVOLUTION

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Tools



Content Creation

With content creation workflow being a critical part of the artistic process, Spat Revolution's ability to run on generic hardware offers the sound designer an opportunity to start an offline conception on a local computer, without the need for specific hardware.

Spat Revolution seamlessly integrates with a variety of DAWs and Playback systems, allowing for local inter-application audio transport and automation. Compatible third party systems include **Ableton Live, Nuendo, Ovation, Pro Tools, Pyramix, Reaper, QLab**, and many others.

Spat Revolution's production suite includes three plugins (in AU, AAX, and VST format): **Spat Send, Spat Return, and Spat Room**.

The user can build automation network cues, write automation of an immersive mix to a timeline or to cues, and preview the results (binaurally or on smaller scale speaker arrangement). The creation phase can be managed on a single computer, and easily migrated to a network of show controllers, audio playback, mixing desks, and immersive audio engines. From creation to delivery!

Real-Time Object-based Oriented Immersive Live Engine

Spat Revolution is a software dedicated to the creation of immersive audio as well as real-time live productions. With the use of virtual spaces (called rooms), it is possible to position and move audio source objects with acoustic simulation.

The processing of Spat Revolution is based on various spatialization technologies: High Order Ambisonic (HOA), Binaural and Transaural, and **Wave Field Synthesis (WFS)**, as well as traditional channel-based 2D/3D renders together with different panning methods (**VBAP, VBIP, DBAP, DUALBANDVBP, KNN, LBAP, AEP**, etc.).



Real-Time Software Engine

Spat Revolution processes audio signals in real-time, allowing you to build immersive audio scenes and interact with them. This integration is accomplished via the **OSC (Open Sound Control)** protocol or via the presence of the **Spat Send, Return, and Room** plugins over the network. This makes it possible to integrate Live mixing consoles, touch remote control devices, or other computers. The Live console brings the ability to provide encoder control for each source object in Spat Revolution and takes advantage of mixing desk snapshot capabilities to create automation with timing interpolation.

This integration is currently offered with the Avid S6L Live Sound console via the Spat Send plugin, or using generic OSC commands with mixing consoles offering OSC control, such as the DiGiCo SD series. The power of OSC means that any third-party system with this capability can potentially be part of the immersive audio control. Spat Revolution also offers support for real-time tracking systems such as BlackTrax (RTTrPM protocol support), Zactrack, and Stagetracker, which can be easily integrated.



Immersive Audio Spatialization Techniques

As an object-oriented mixing software, Spat Revolution adapts to various speaker arrangement configurations and processes the audio mix scene to the requested diffusion system. The different technologies and panning methods in the software allow it to adapt easily to speaker design arrangements for various productions with spatial audio techniques and panning methods to suit different applications. Spat Revolution's "multi-rooms" concept delivers simultaneous-use support for multiple immersive

technologies including 2D/3D Channel-based, High Order Ambisonic (HOA), binaural, transaural and Wave Field Synthesis (WFS), enabling the user to deliver to multiple diffusion systems (virtual spaces using all or partial speaker arrangement setups). This offers extensive flexibility in creating custom 2D or 3D speaker arrangements, addressing both conventional immersive stage setups where 5, 7, or more speaker hangs are spread across the stage with somewhat equal separation between each, as well as arrange-

ments of loudspeakers by the dozen in arbitrary locations. This enables a sound designer to, for example, create a binaural output preview on headphones while on a plane, and a

surround speaker arrangement for studio work, while simultaneously creating content for multi-speaker arrangements of the actual show.



N channels



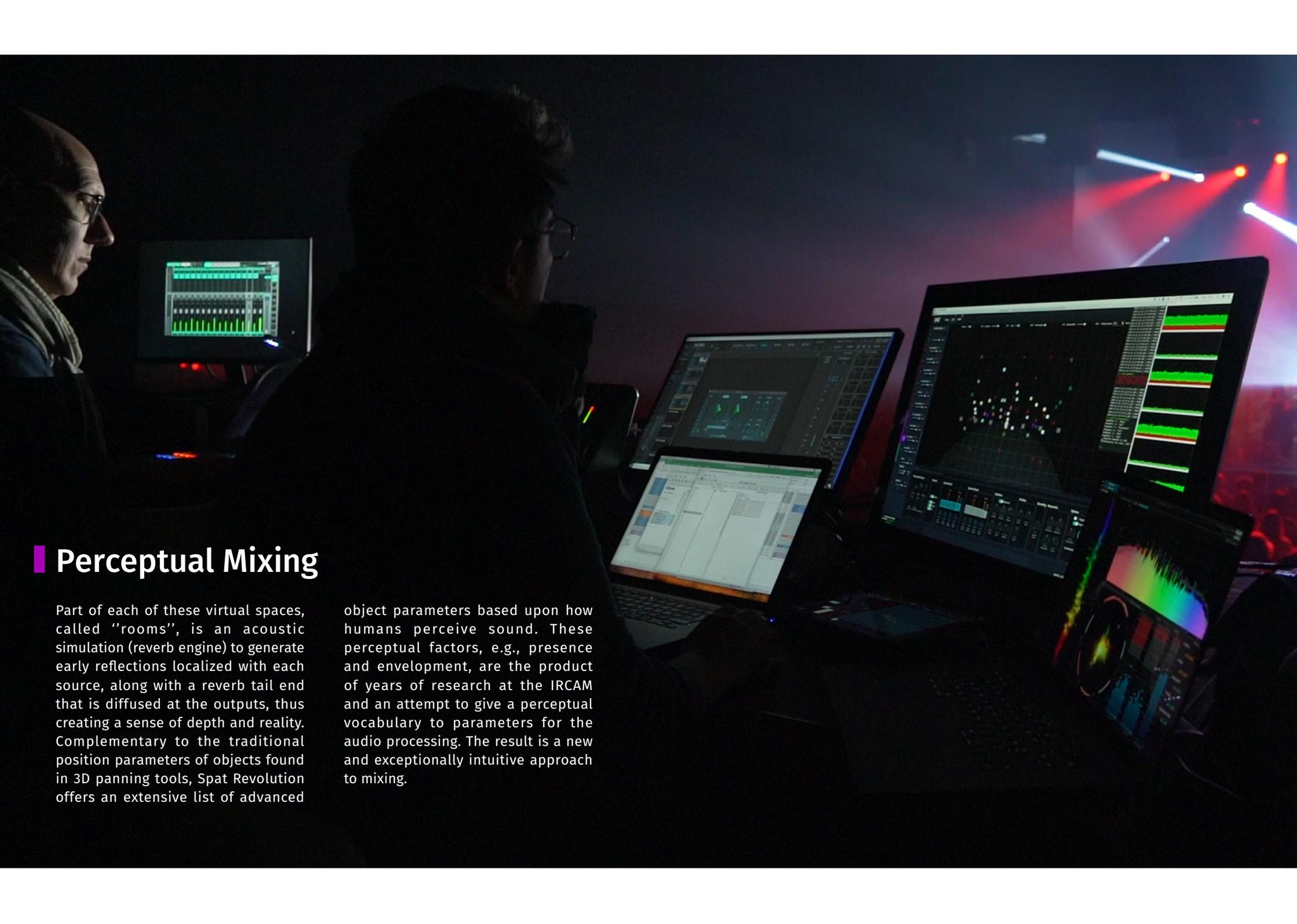
Binaural



Ambisonic



WFS



■ Perceptual Mixing

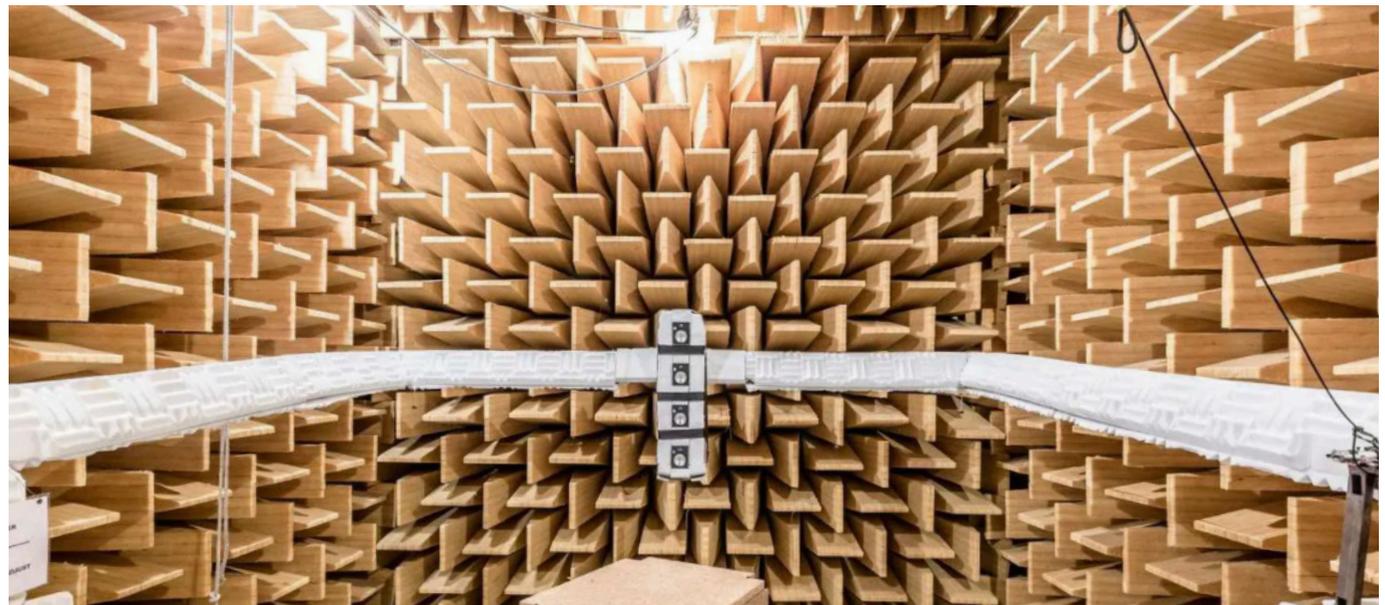
Part of each of these virtual spaces, called "rooms", is an acoustic simulation (reverb engine) to generate early reflections localized with each source, along with a reverb tail end that is diffused at the outputs, thus creating a sense of depth and reality. Complementary to the traditional position parameters of objects found in 3D panning tools, Spat Revolution offers an extensive list of advanced

object parameters based upon how humans perceive sound. These perceptual factors, e.g., presence and envelopment, are the product of years of research at the IRCAM and an attempt to give a perceptual vocabulary to parameters for the audio processing. The result is a new and exceptionally intuitive approach to mixing.

Software engineering and technology

FLUX:: has been a software development partner of French research institute IRCAM (www.ircam.fr), since 2008, and Spat Revolution is the result of decades of research and achievements. Many of these technologies have been successfully deployed in live sound installations with products including Spat in MaxMSP, Panoramix, with the legacy Spat audio plugin, and most recently with Spat Revolution.

Software engineering and technology
The FLUX:: and IRCAM cooperation offers a variety of spatial audio techniques to users and designers, sharing a vision of open development. Behind these various spatialization and audio panning techniques is the desire to offer creativity, flexibility, and the ability to adapt to each application and creative challenge, whether sweet spot-centric, live performance, or installation-based, and irrespective of where the audience may be distributed.



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Hardware

Running on generic hardware means that a vast pool of audio interfaces (e.g., MADI, network AVB, Dante / AES67 virtual audio entities) and a wide range of sample rate options (from 44.1Khz – 384Khz), are available for the system device setup.

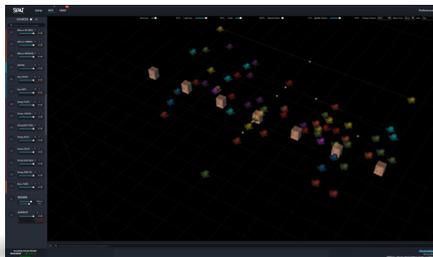
Low latency can be achieved with an appropriate choice of audio interface, coupled with Spat Revolution's ability to operate with small block size software options (starting at 16 block size). The latency is fixed, predictable, and can be easily defined in accordance with the user's hardware setup being properly resourced and optimized for real-time audio.



Redundancy

Redundancy and the critical need for a complete fail-over in live production, the Spat Revolution immersive system can operate in redundant mode, with the secondary system simultaneously outputting

discrete audio channels as back-up output. Two Spat Revolution systems (Spat Revolution license includes two activations) can be deployed and simultaneously receive audio feed and automation. Audio is output from both the primary and secondary systems, providing redundant sources to the diffusion loudspeaker system. To this extent, Spat Revolution can be deployed strictly as remote control (no audio processing), targeting commands to two Spat computer engines dedicated to audio processing via OSC commands.



Live production, Immersive Technical Services, and Consultancy



To support live production deployments, technical services are available from FLUX:: Immersive Consulting Group, ranging from fully configured hardware/software system specification/packages based on specific project requirements to pre-design, guidelines, deployments, system tuning, commissioning, and training. Additional functionalities are available with the Live Production bundle

license option and include Wave Field Synthesis (WFS) that can be applied to a Frontal system for example (7-8 frontal arrays or more), Show/ Config modes, Remote and Server "renderer" mode (where the computer(s) are dedicated to processing without GUI user interface and remote computer handle control) and Snapshot system with interpolation.

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