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Dott. Donato Masci Acoustic designer & Consultant

The evolution of music production studios:

from commercial recording studio to the project (production) studio

26 / Apr — 2018



Donato Masci Who we are

We design places for your sound

(IT)

Read more





Donato Masci Studio Sound Service – Who we are

Studio Sound Service is an acoustic design firm, located in Florence, Italy. Since 1983 we design rooms for music and audio/video production.

Some Projects:

- Barys Arena (ice hockey) @ Astana, Kazakhstan;
- FOX post-production studios

 Münich (DE);
- FOX post-production studios

 Hammersmith, London (UK);
- D:POT Recording Arts @ Prato Fabrizio Simoncioni;
- Mulinetti Studio @ Genova Alberto Parodi (Resolution Award 2015 Best Audio Facility, Nomination);
- The Garage

 Civitella v.d.C. (AR)
 (Resolution Award 2014
 Best Audio Facility, Nomination);
- House of Glass

 Viareggio (LU) Gianni Bini (Resolution Award 2013
 Best Audio Facility, Nomination);

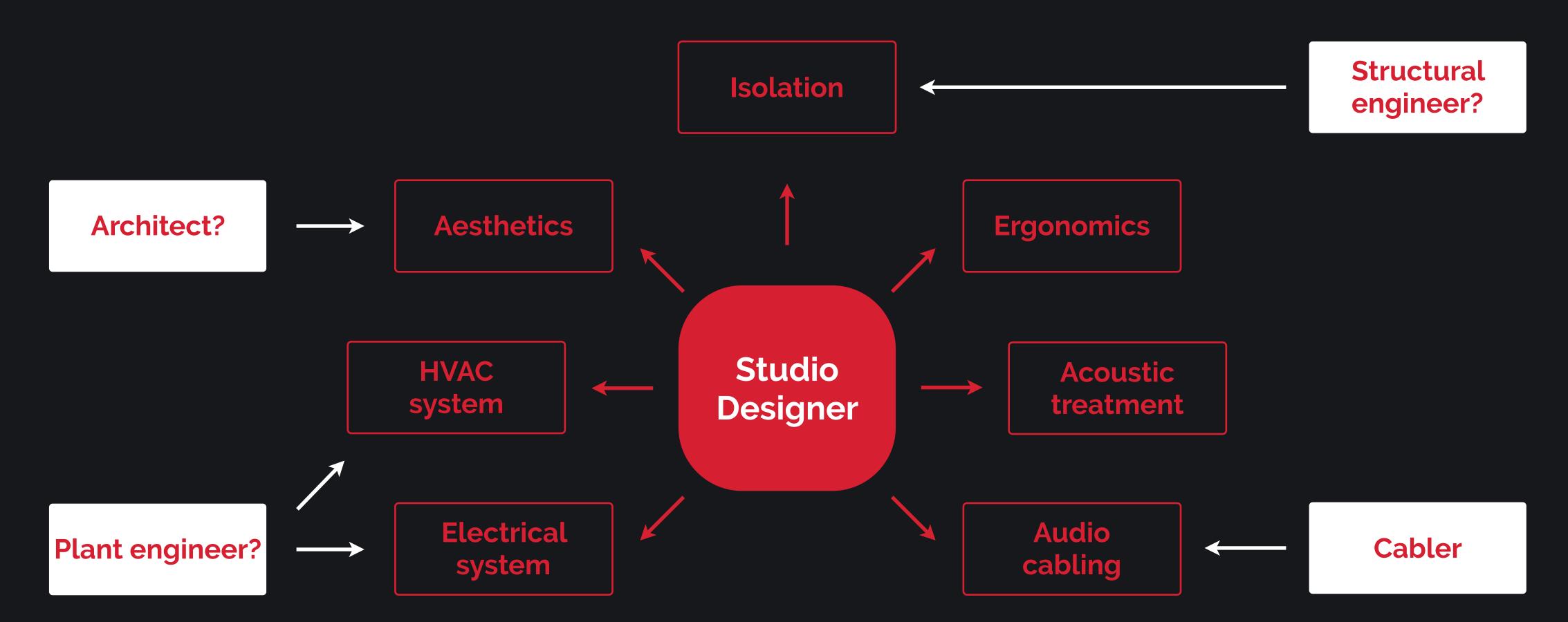
- Vinai Studio @ Brescia;
- Renato Zero Studio @ Roma;
- In House (Dolby® approved Sorrentino) @ Roma;
- George Lucas Home Theater, Italy;
- Chiesa di Santa Maria Nuova (Arch. Mario Botta) Terranuova Bracciolini (AR);
- Sala Proiezioni Museo Ferrari @ Maranello (MO).



How are the recording studios designed?









How are the recording studios designed?

- A. Acoustic CAD software (EASE, CATT, ODEON) does not work at frequencies below 100 Hz, can not simulate the room's modal response.
- B. FEM (COMSOL) software can be useful for low frequencies, but they are not so used (there are no "simple" software to use).



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Thus, as a rule, only basic physics, geometry, experience and **standard design** are used



What can not be a recording studio? *(philosophical system)*

How can a recording studio be defined?

- A. An anechoic room (*it would be alienating to work for hours !!!*)
- B. A "typical" domestic room (how big and which country?)

As a place where you can listen (and work) in a more neutral way



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AES, ITU, EBU Standards and guidelines



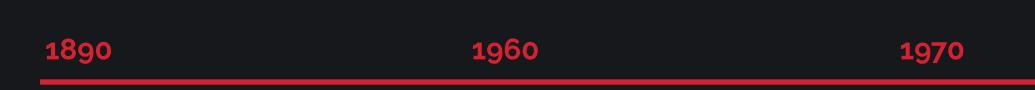
1950 First control rooms (random design corner, etc.)

1890	1960	1970	1980	1990 2000
<u>AM Radio</u> <u>Re</u> <u>Electrical Phonographs</u>	<u>eel to Reel First stereo Dol</u> <u>AM/FM/Phono</u>	<u>by Cassettes</u>	<u>44.1/16 Digital CD</u> Dolby Surround, T	DVD-A. SACD
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1914 Ford "T" First car audio system	1952 8-tracks recorder		1982 Commodore Commodore 64	1995 DVD
1904 Marconi: Radio Patent	1956 STEREO tape recordings 1958 First STEREO LP		1982 Sony & Philips Compact Disc (CD)	1997 MP3 Popularity of MP3 compressed format
1926 John Logie Baird Invention of Television	1962 Philips Compact Casset	e Tape	1985 IXI First digital audio playe	er 1999 Napster mp3 peer-to-peer sharir
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1936 Magnetophone First magnetic tape reco	rder 1969 Doll	by-B noise reduction		iPod





1950 First control rooms (random design corner, etc.)



The first control rooms of the '50s were treated in a "casual" way with a little sound absorption and occupied a small part of the studio, at random, like a corner or a closet.

The introduction of the stereo has brought innovation also from the point of view of acoustic design (L / R symmetry).

Horn-Coupled Control Room by Bill Putnam & Mike Rettinger

1980	1990	200





1950 First control rooms (random design corner, etc.)

> '60 Tom Hidley (first bass trap)

1890	1960	1970	1980	1990 20	000
<u>AM Radio</u> <u>R</u> <u>Electrical Phonographs</u>	<u>eel to Reel</u> <u>First stereo</u> <u>AM/FM/Phone</u>	<u>Dolby Cassettes</u>	<u>44.1/16 Dig</u> Dolby Surre 70mm & IM	round, THX	
1886 Tainter & Bell: Invention of the gramophone (recording on disk)	1948 12" Vinyl introduction 1949 AMPEX 300	1971 CP	U microprocessor 1978 Sony	<u>digital system</u> 1992 Sony	
1901 First transatlantic radio transmission	1954 First portable transisto radio	r	Walkman 1982 Commodore	MiniDisc (MD) re 1995 DVD	
1914 Ford "T" First car audio system 1904 Marconi:	1952 8-tracks recorder 1956 STEREO tape reco	rdings	Commodore 64 1982 Sony & Philij	1997 MP3	
Radio Patent 1926 John Logie Baird Invention of Television	1958 First STEREO 1962 Philip Compact (Compact Disc (CI 1985 IXI First digital au	udio plaver 1999 Napster	
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First magnetic tape reco	order 196	9 Dolby-B noise reduction			





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Stereo + music industry -> new control room, new acoustics.

Interview Tom Hidley in which he says that his best listening experience has been on a roof of a house (semi-anechoic room), the diatribe begins between those who prefer "normal" listening and those who want to listen " almost anechoic ".

Hidley invents the "Bass Trap" type baffles.







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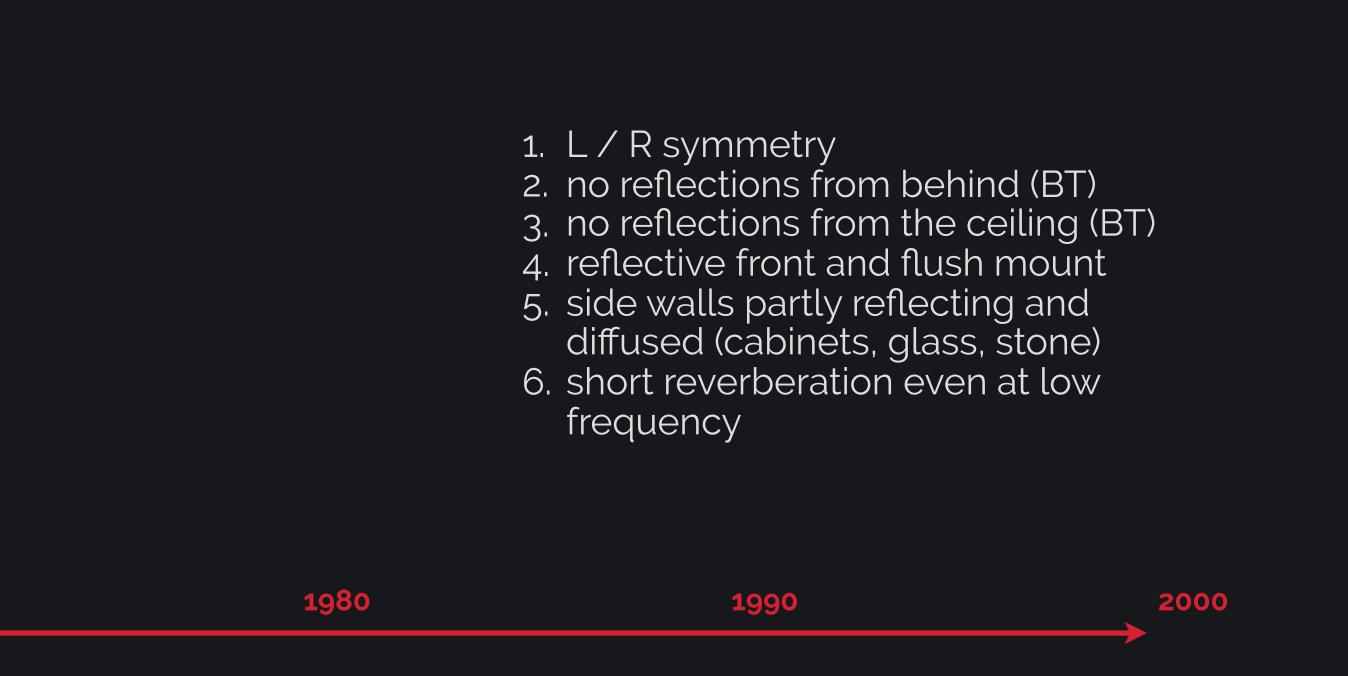
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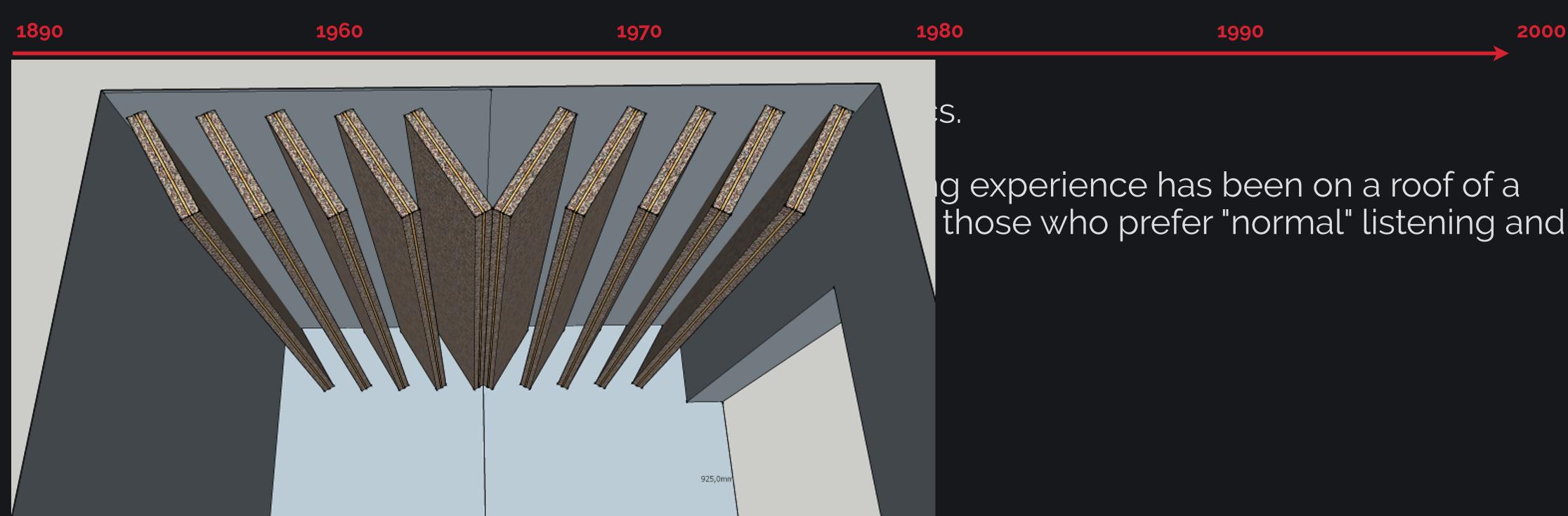
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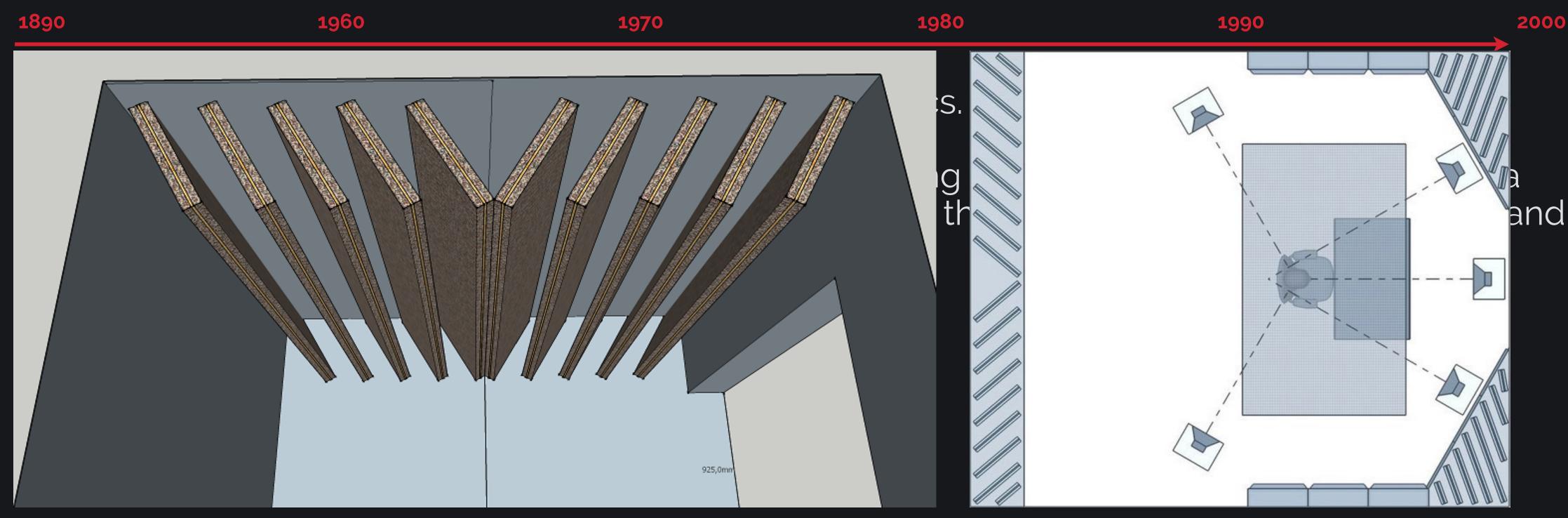
- 1. L / R symmetry
- 2. no reflections from behind (BT)
- 3. no reflections from the ceiling (BT)
- 4. reflective front and flush mount
- 5. side walls partly reflecting and diffused (cabinets, glass, stone)
- 6. short reverberation even at low frequency





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1904 Marconi:	1956 STEREO tape recordings		1982 Sony & Philips	1997 MP3 Popularity of MP3
Radio Patent	1958 First STEREO LP		Compact Disc (CD)	compressed format
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1978 Tom Hidley -Westlake Time Delay Spectrometry





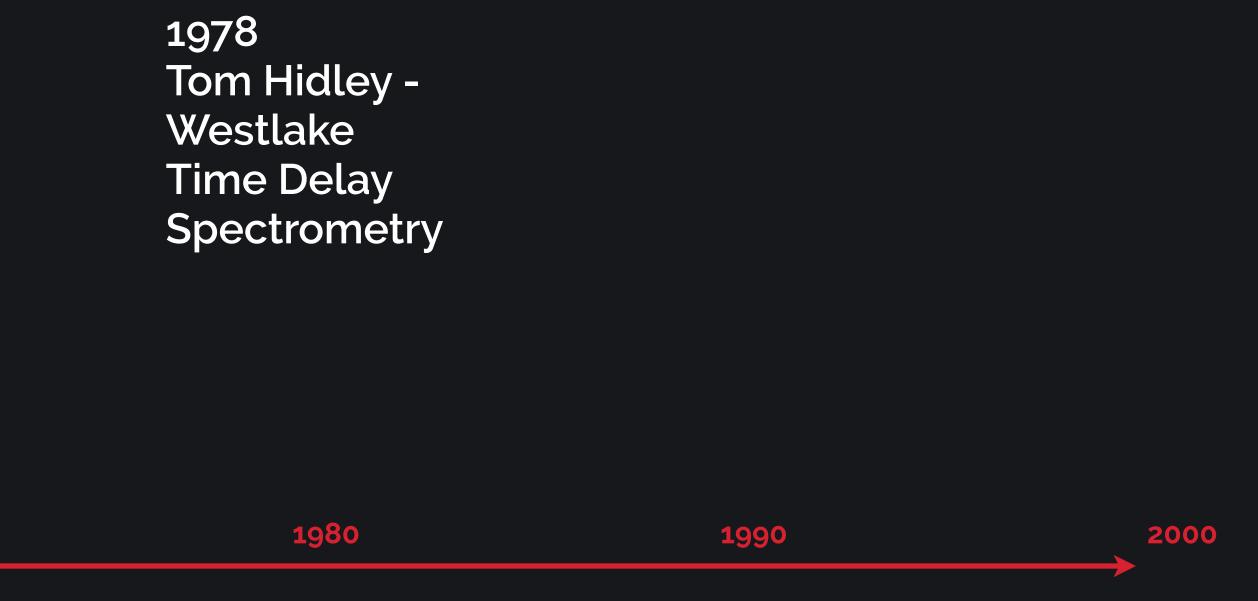
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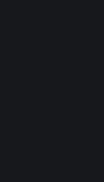
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Introduction of TDM to analyze room acoustics is useful for acoustic design. The first reflections (early reflections) can be noted: the studios done by Tom Hidley, who had a rigid front wall, showed comb-filters at the listening point.

Tom Hidley begins to cover the studio fronts with sound-absorbing material and Chips and Don Davis create the LEDE.







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	1980		1990		2000
processor		<u>44.1/16 Digital CD</u> Dolby Surround, THX 70mm & IMAX		MP3, AC3, DTS 96/24 DVD-A, SACD 5.1 compressed digital system	
	1978 Sony Walkman			92 Sony hiDisc (MD)	
	•	82 Commodore ommodore 64		1995 DVD	

1982 Sony & Philips

Compact Disc (CD)

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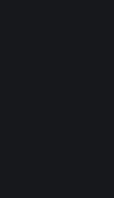
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LEDE, Live End Dead End: the idea, contrary to what was previously proposed, was to make a very absorbing front (Dead End) and a live back, with diffusion (Live End). The reflections of the back were not to be mirrored, otherwise they brought the same disadvantages of Tom Hidley's forehead. The Schroeder speaker on the back (QRD - Skyline) was introduced.

The psychoacoustic theory of LEDE is one of the most debated. Critics introduce reflective panels (**Haas-Kickers**) that reflect the sound from the back of the room diagonally, an idea already considered by Hidley in the past.

1978 Tom Hidley - Westlake Time Delay Spectrometry		
1979 Chips and Don Davis LEDE design 1980	1990	200







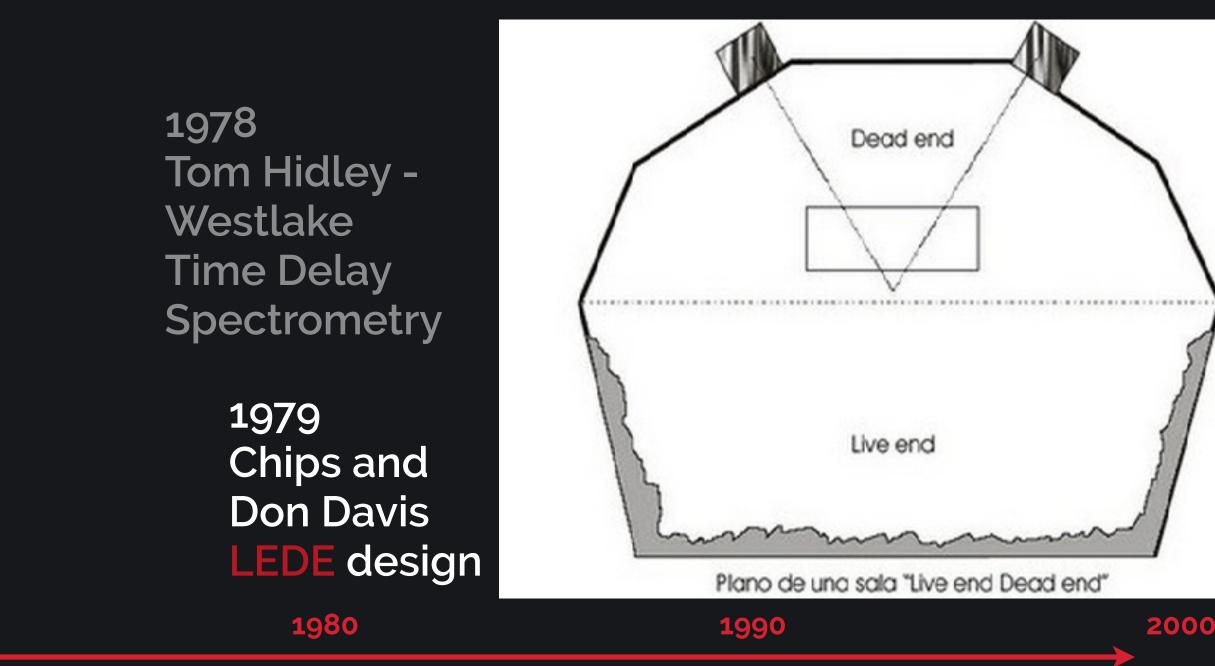
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Don LED	ke elay ometry os and Davis E desigr	1984 RFZ Reflection free zone		
1	980	1990)	2000
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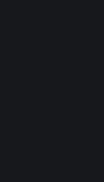
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RFZ, Reflection Free Zone: starting from the LEDE principle, it is considered an extension of this. It is based on purely geometric principles: the idea is to modify the inclination of the ceiling and the front wall so as to form a zone without first reflections around the listening area.

The approach is valid for high frequencies down to 500 Hz, but the goal is to maintain a more stable and precise stereo image in the range between 500 ÷ 5000 Hz.

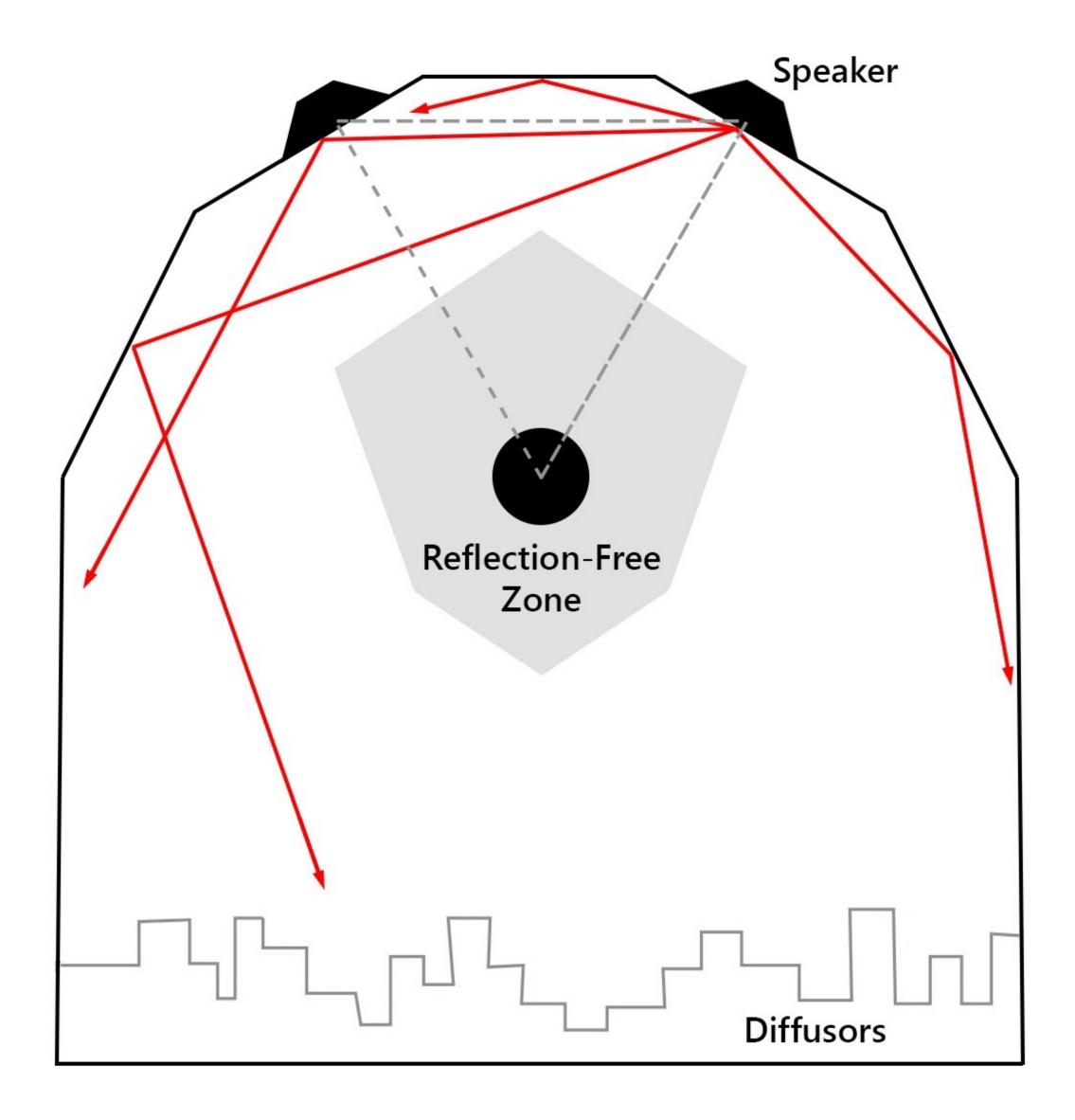
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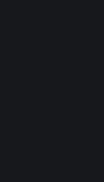
Donato Masci



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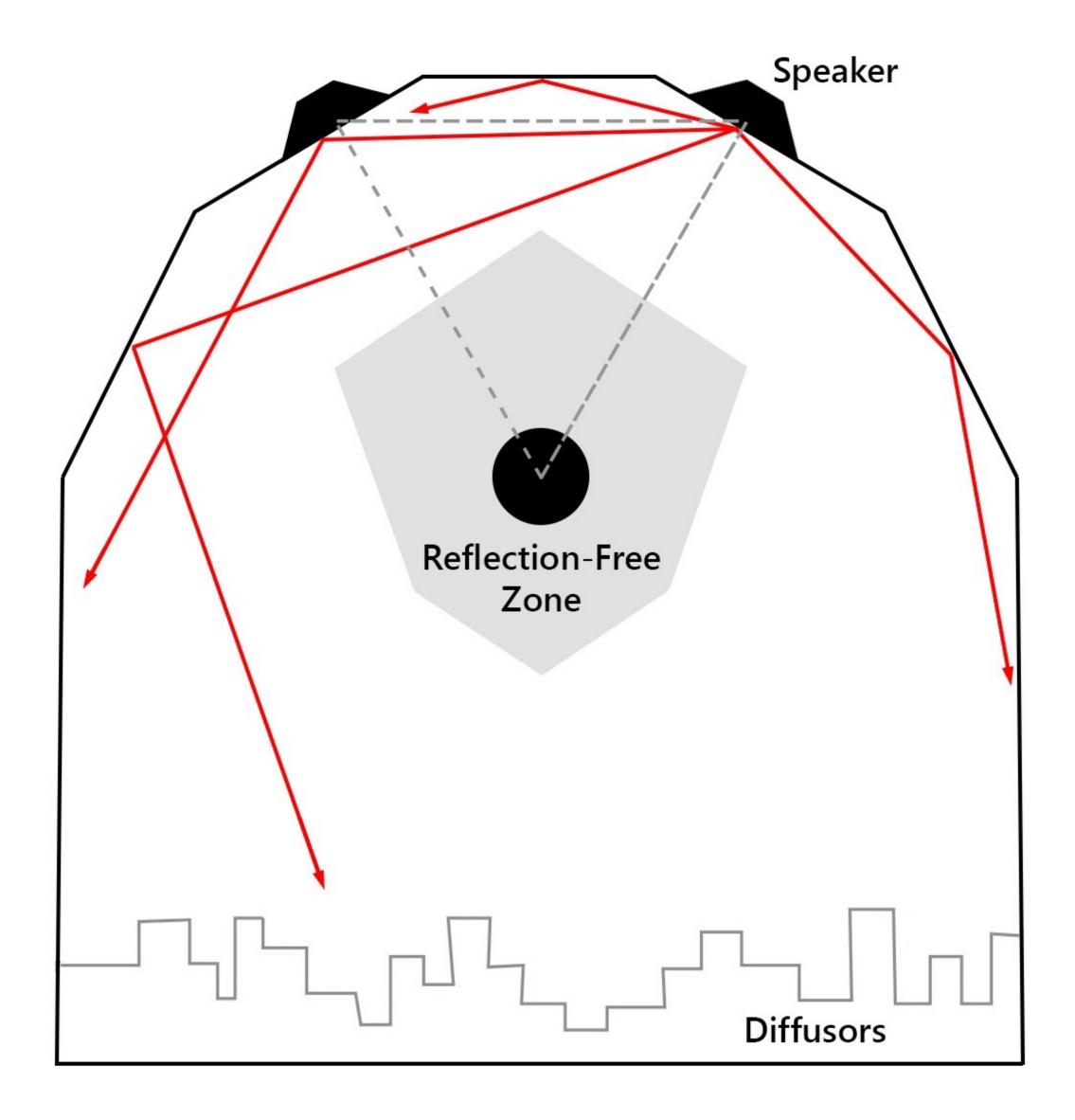
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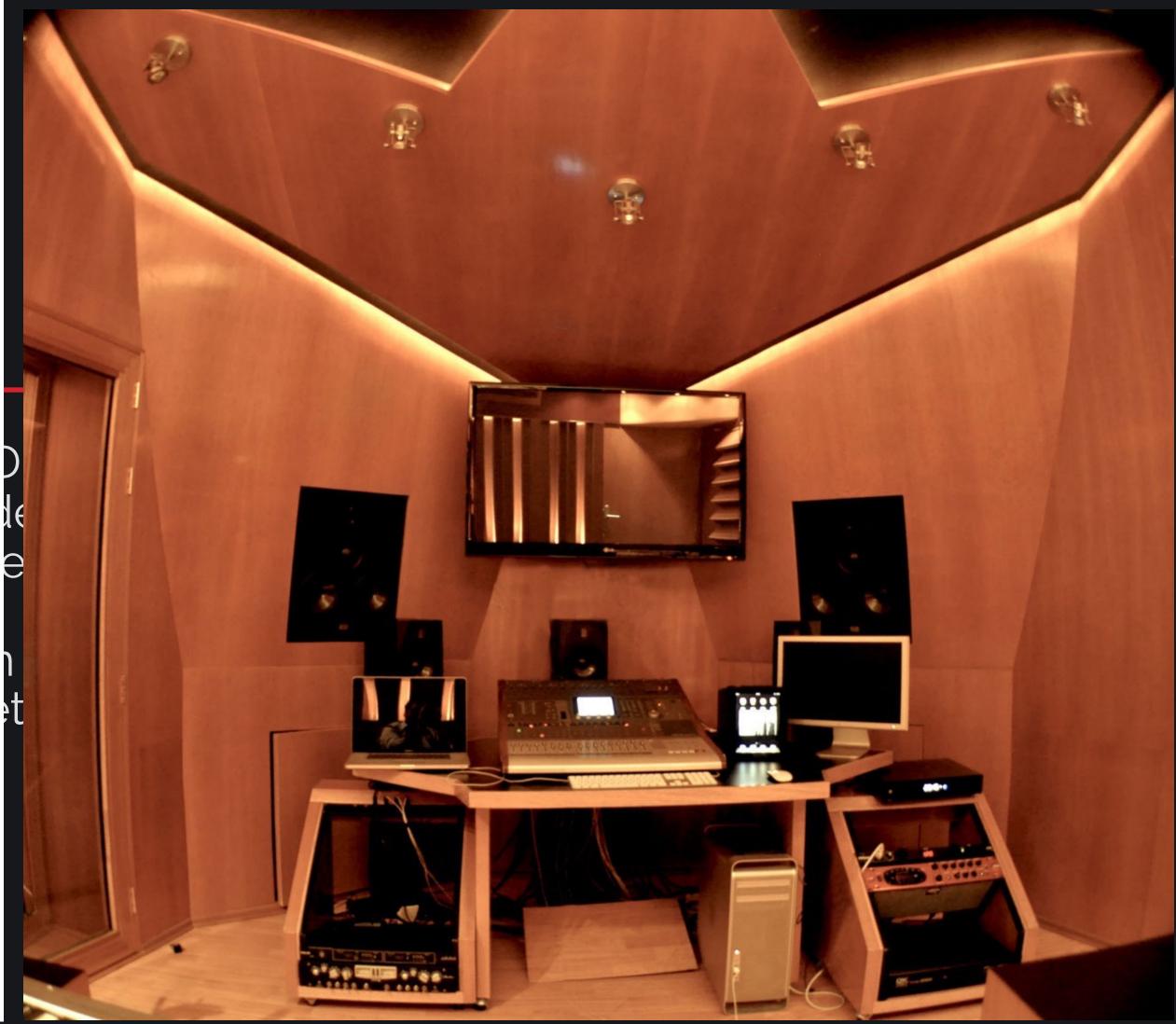




Donato Masci



1978 Tom Hidley -Westlake





SERVICE	How are the reco	rding studios designed?				
i (1950 First control rooms (<i>random design</i> corner, etc.)		1978 Tom Hidley - Westlake Time Delay Spectrometry	E	1990 Bob Walker (BBC) Controlled Image Design CID	
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1890	1960	1970	1980	1	1990	2000
<u>AM Radio</u>		<u>olby Cassettes</u>	4	<u>4.1/16 Digital CD</u>	<u>MP3, AC3, DTS 96/24</u>	
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1904 Marconi: Radio Patent	1958 First STEREO LP			Sony & Philips pact Disc (CD)	Popularity of MP3 compressed format	
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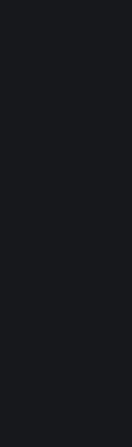
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CID, Controlled Image Design: Developed by Bob Walker for the BBC (the European recording studio industry was far behind the American market in those years), is based on a principle similar to the RFZ, i.e. creating an area without strong early reflections near the listening point, but without introducing a large amount of absorption.

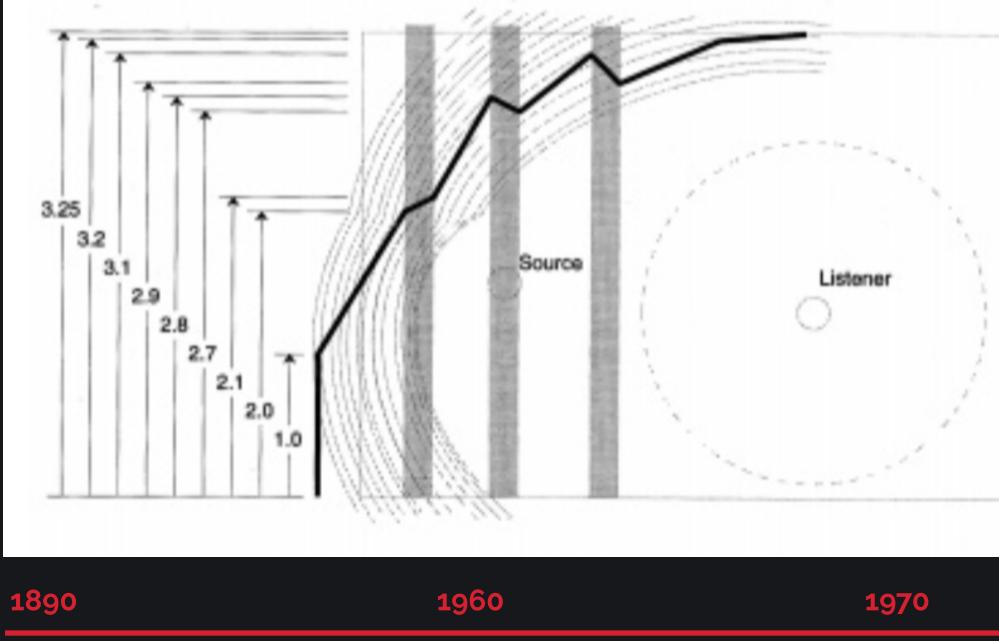
The reverberation time is a little longer (0.3 \div 0.4 s) but the first reflections should be -15 \div -20 dB lower than the direct sound.

This design had been used to study free-standing monitors, as the BBC required. Surely it is a design that favours listening similar to the "home" one, rather than the semi-anechoic one.

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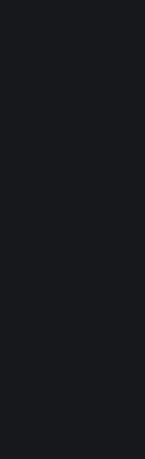


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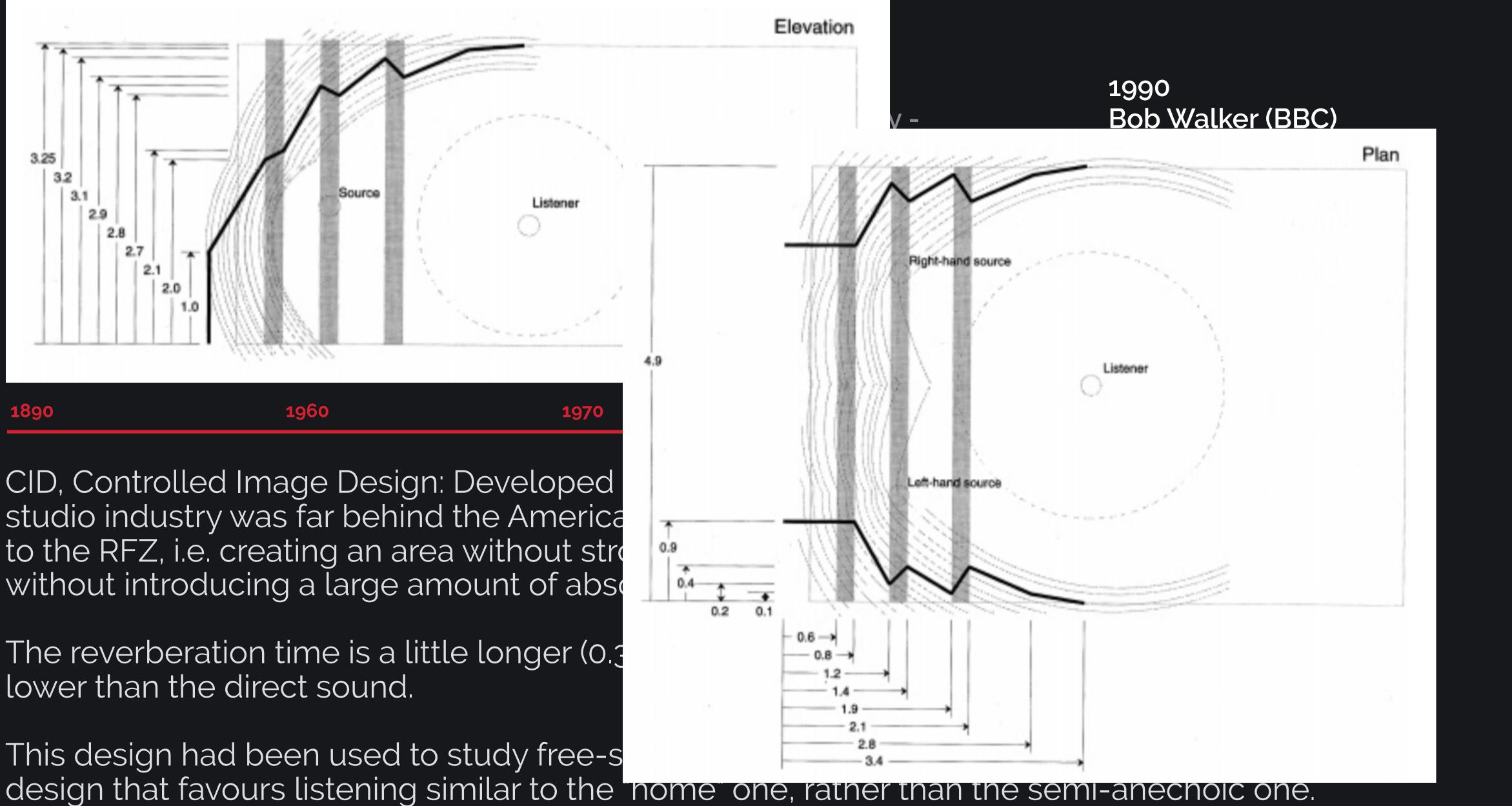
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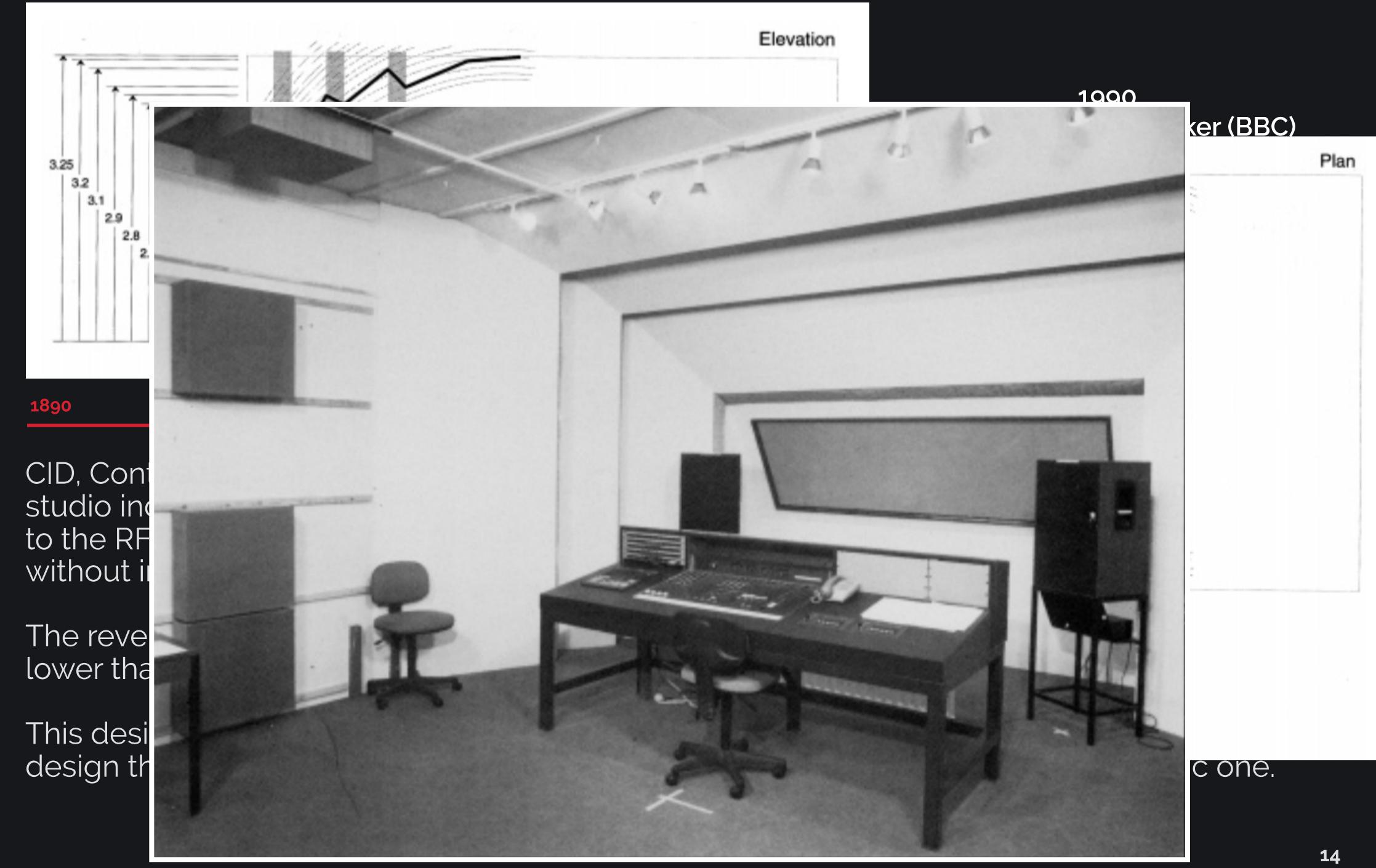
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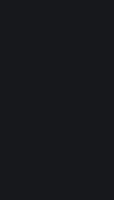
1890	1960	1970

Non-Environment, still the state of the art.

It starts from the old principles of Tom Hidley, of the semi-anechoic chamber (listening to the roof), from the idea of having a drier reverberation time (0.2 s). The idea is to have only 2 reflective walls: the front and the floor. The other walls are more absorbent possible, with broadband absorbers that go down very low (bass-trap baffles etc.).

Nowadays it is normally used for medium-large size studios, thanks to Toyashima, medium-high frequency diffusion elements have been introduced on the back and on the side to give some reflections and a more natural feeling of listening. This, with its variations, is considered the most effective technique.

1978 Tom Hidley - Westlake Time Delay Spectrometry 1979 Chips and Don Davis LEDE desig	Cor Des 1984 RFZ Reflection free zone	90 6 Walker (BBC) 6 trolled Image 30 1991 1991 Tom Hidley, Philip Newel Non-Environment	
1980	1990		200

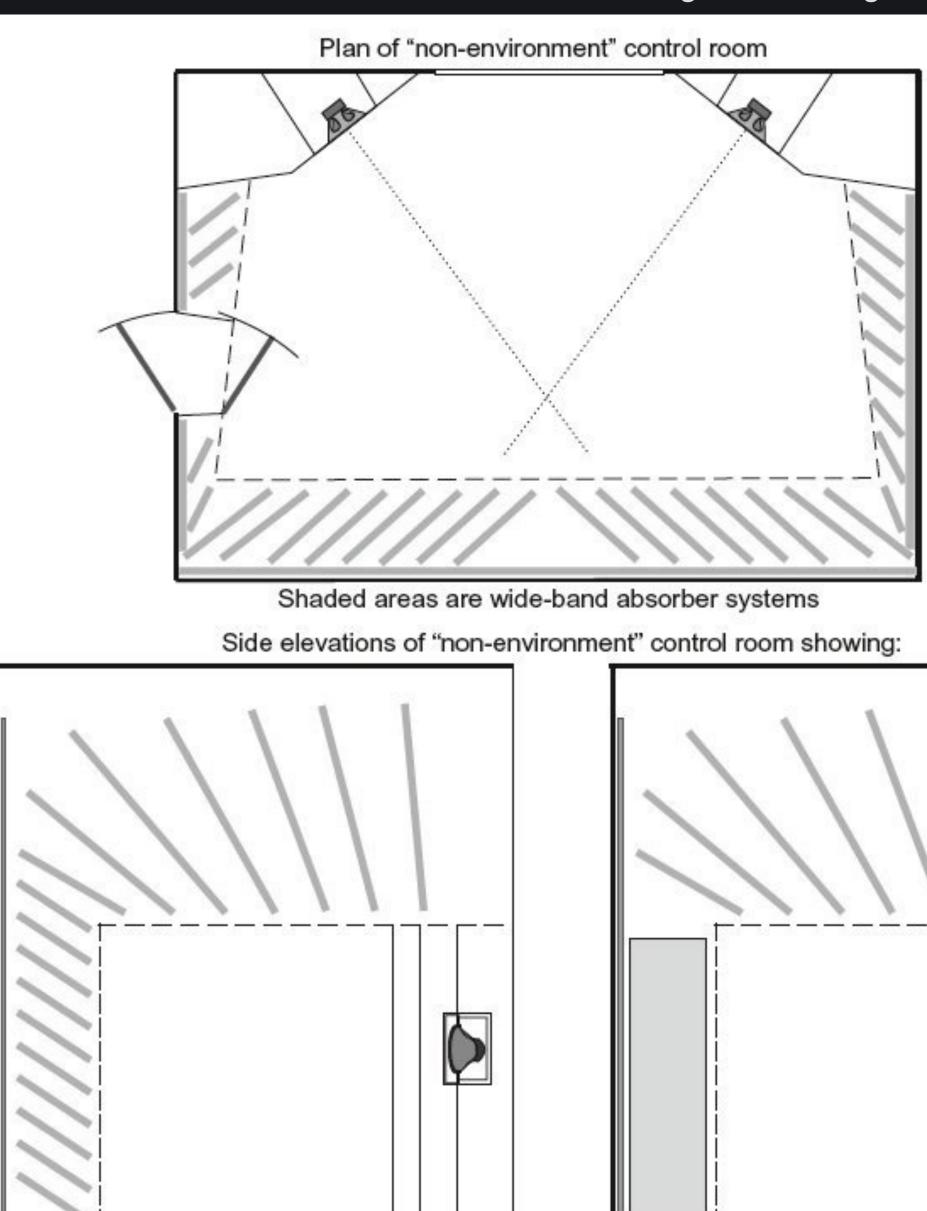






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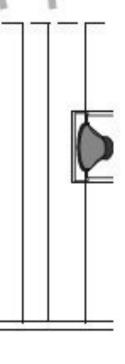


(a) Horizontal rear absorbers

(b) Vertical rear absorbers

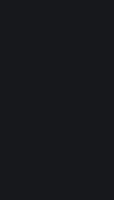
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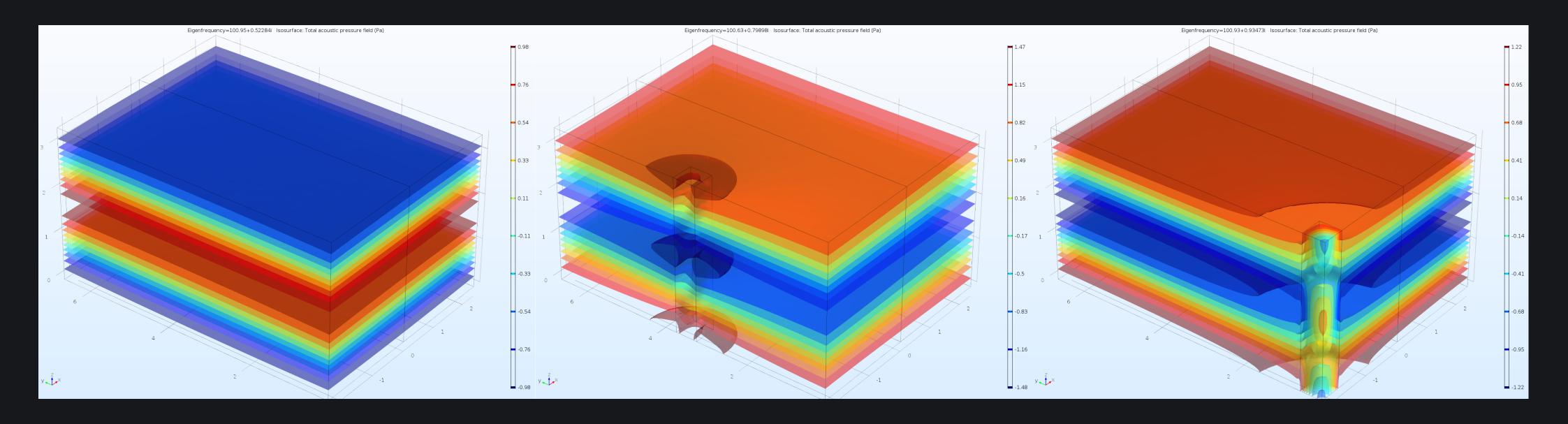
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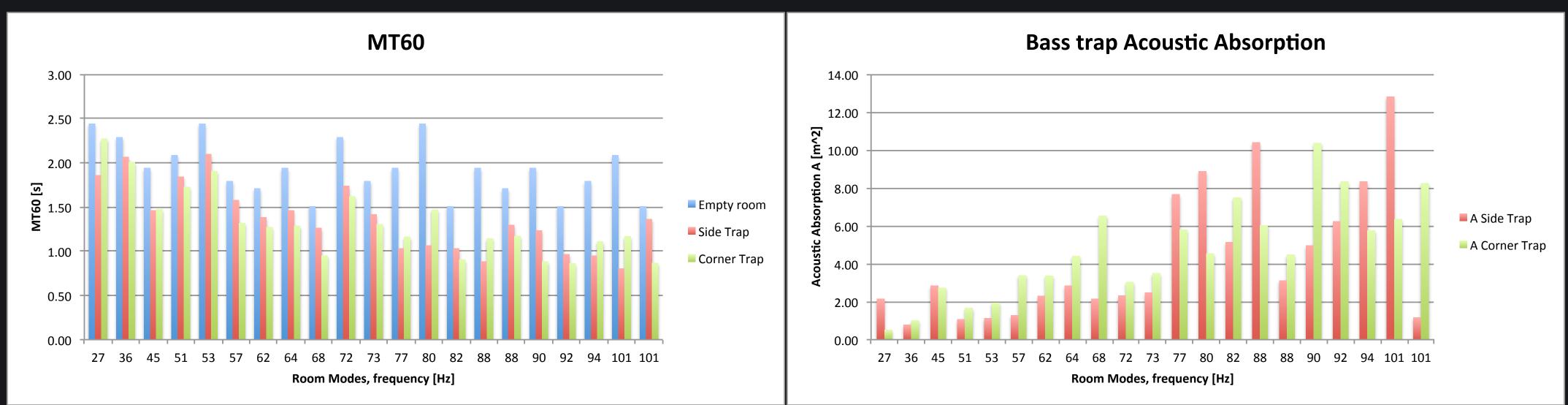






Donato Masci How are the recording studios designed? FEM simulations

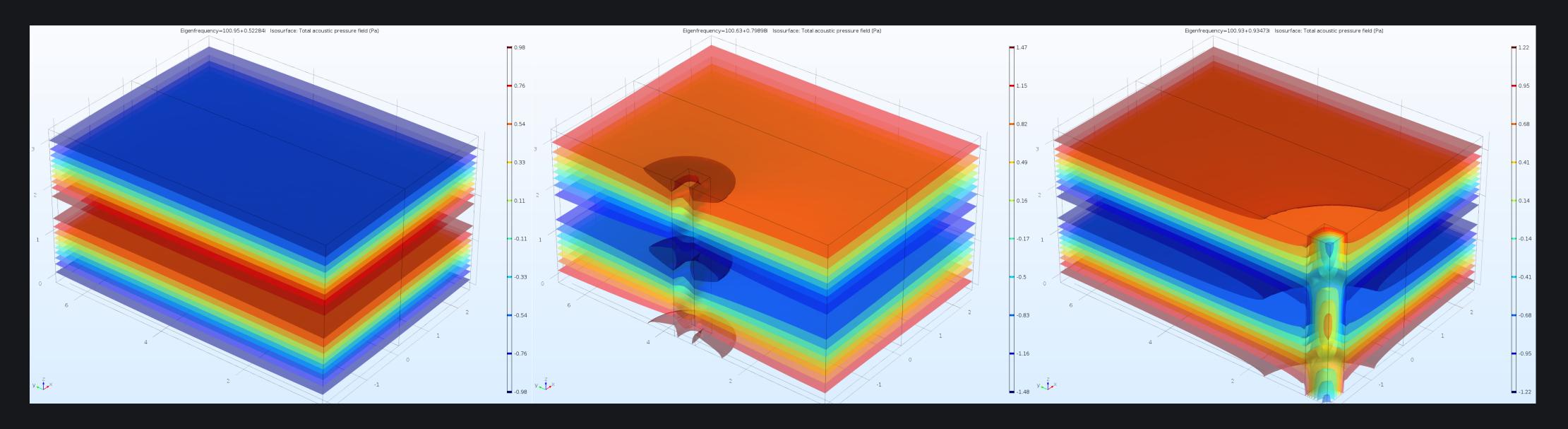


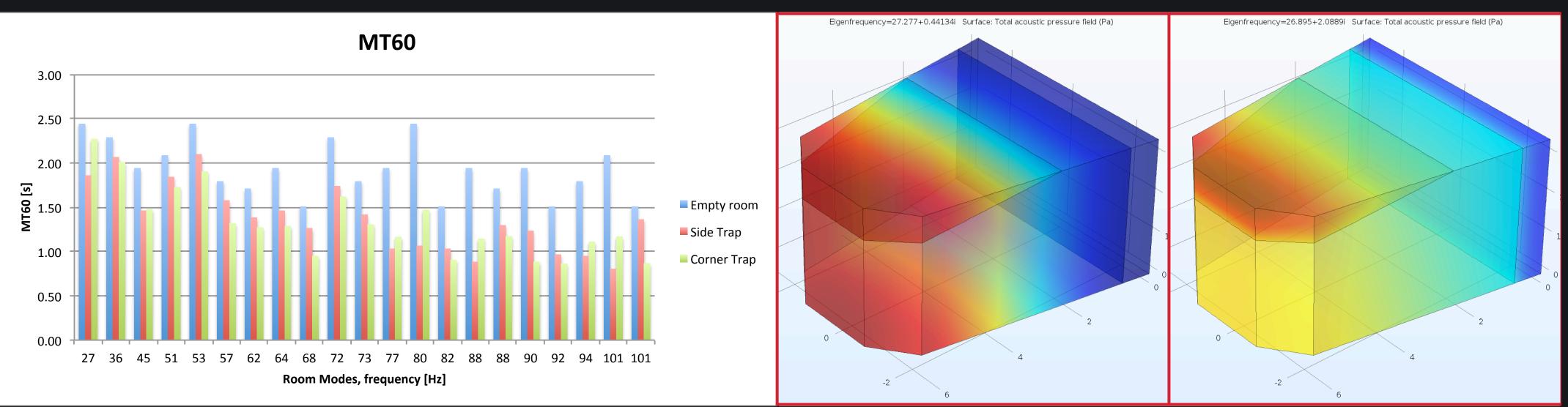


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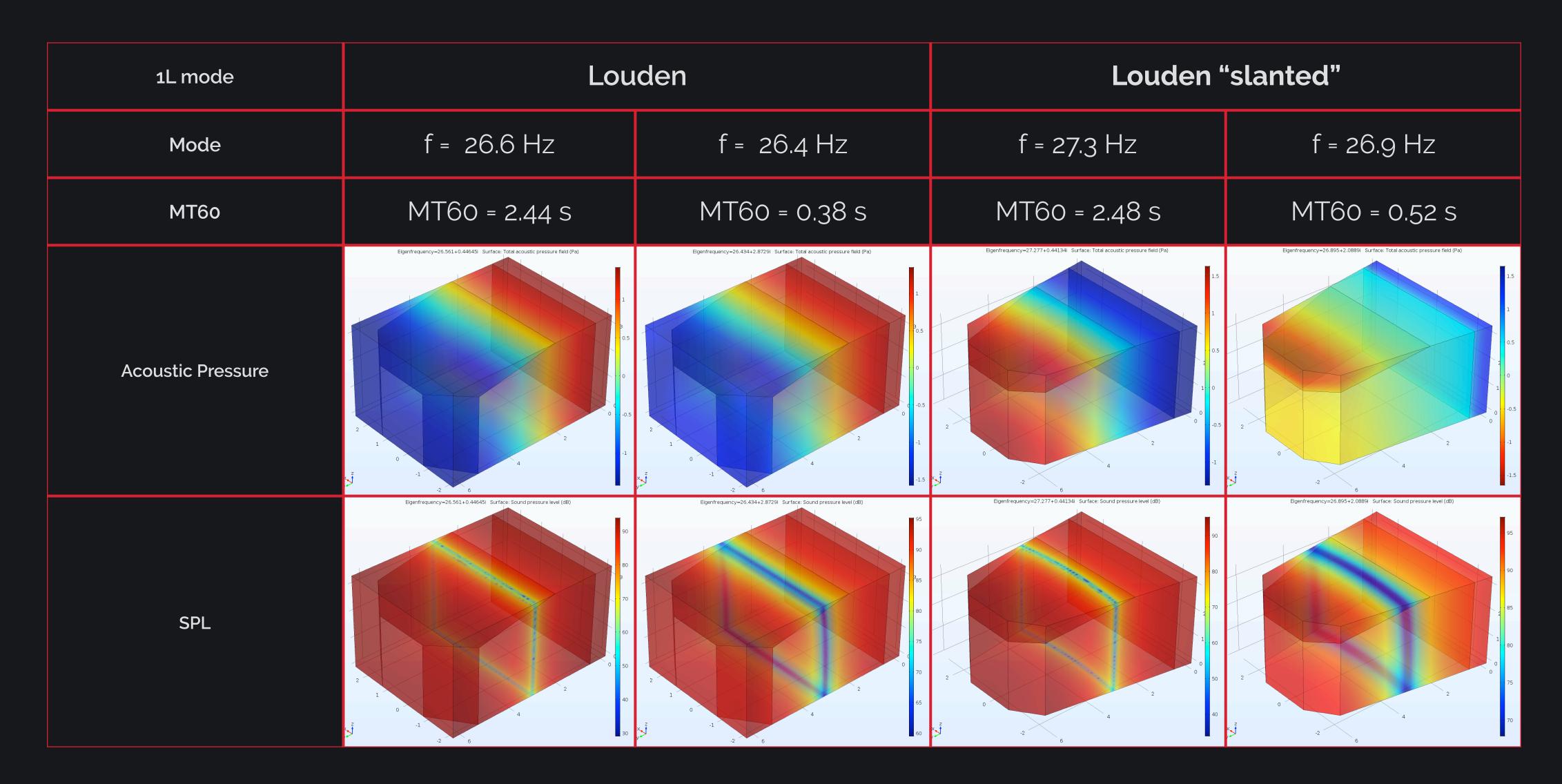
Donato Masci How are the recording studios designed? FEM simulations





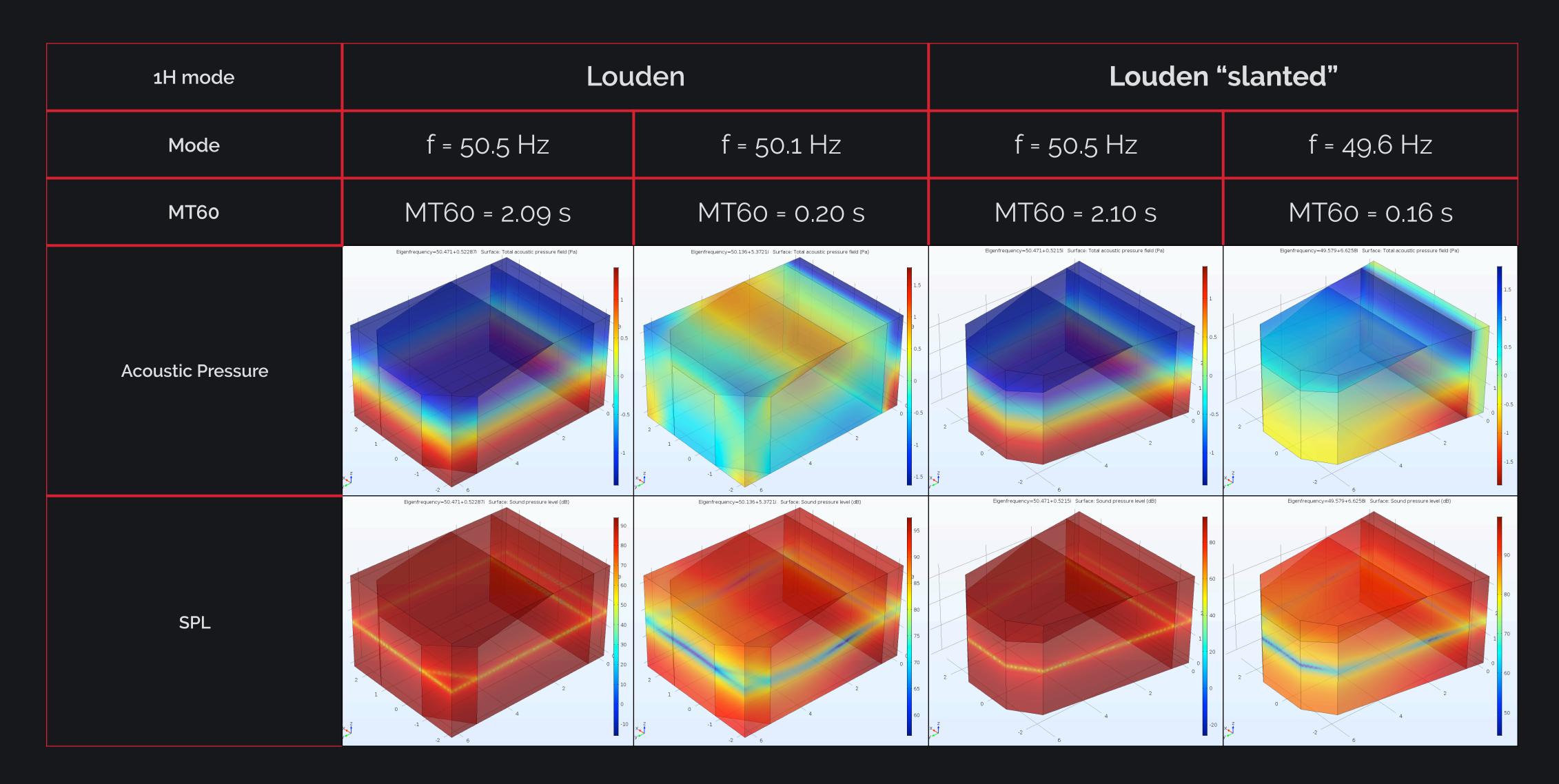


Donato Masci How are the recording studios designed? FEM simulations





Donato Masci How are the recording studios designed? FEM simulations





Recording studios classification

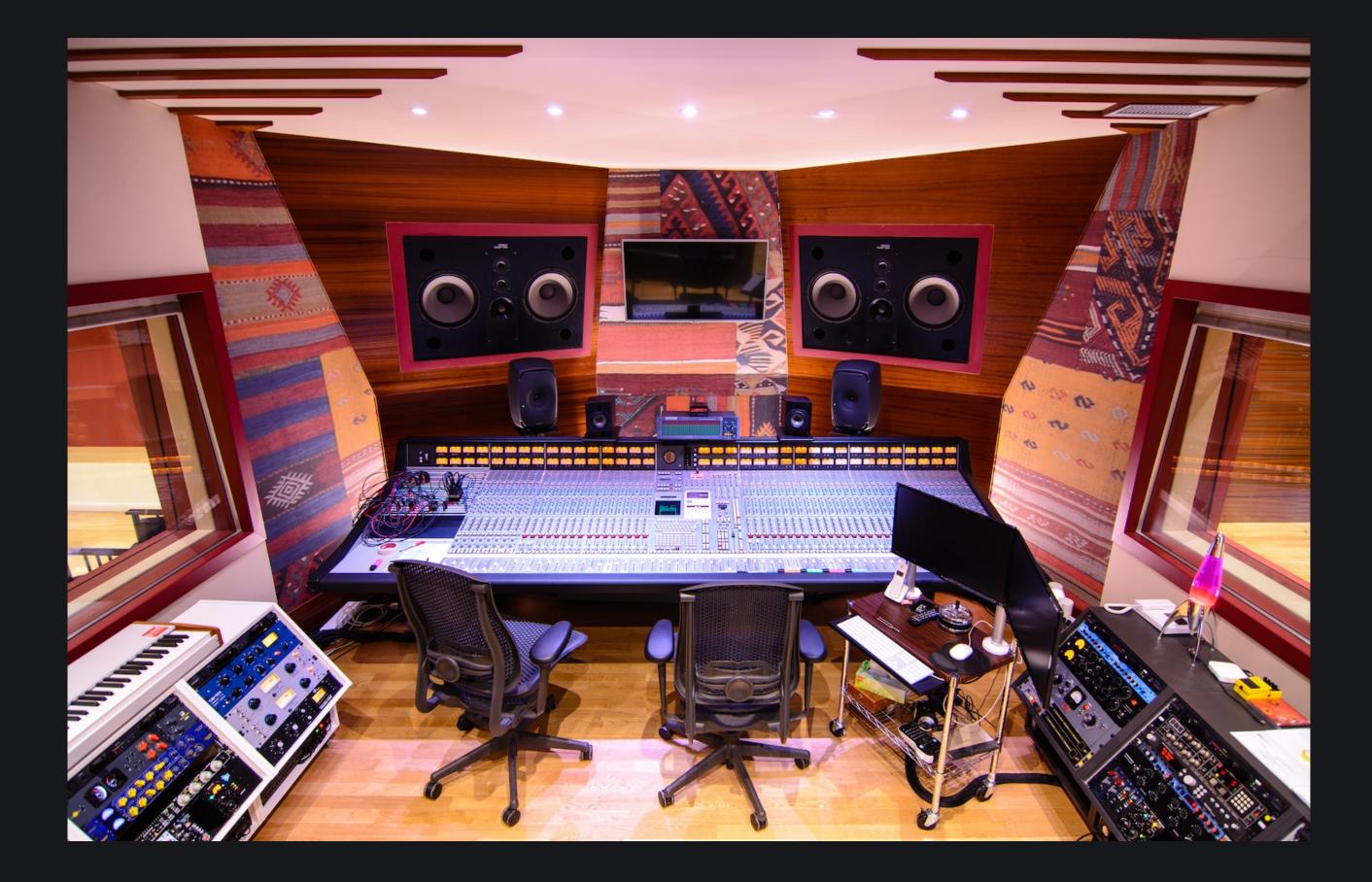




Pro studio according to wikipedia

The professional recording studio is usually the largest of the three types. It almost always features recording rooms and control rooms as well as the best analog and digital technologies.

Performs third party recordings of material that almost always ends up in the music industry.



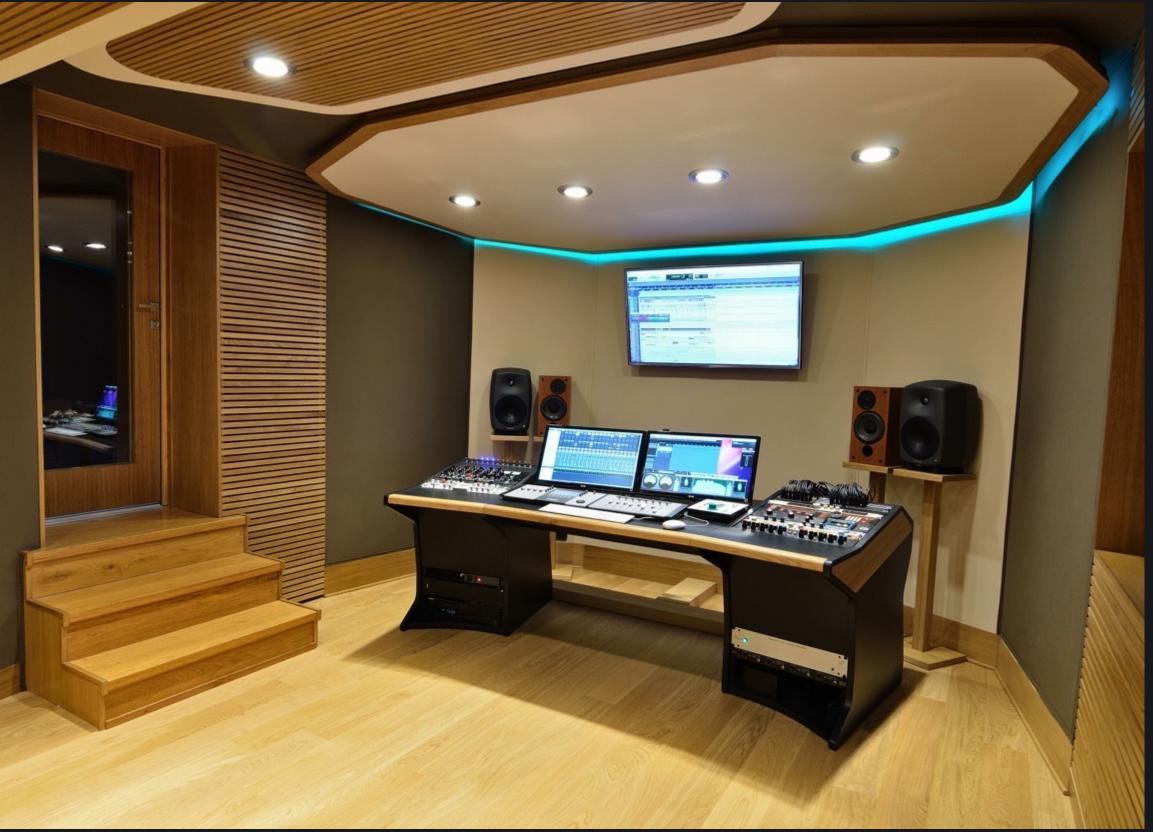


Project studio according to wikipedia

Often the project studio is born to complete the registration of a project by an artist or a band. At the same time or afterwards also carries out third party recordings of both demos and records for the music industry.

It is usually equipped with at least one recording room and a control room and is well supplied both with analog and digital equipment.







Home studio according to wikipedia

The home studio is the home version of the project studio. Housed in the home, it usually has the sole purpose of producing demos or records pre-productions. With the decrease in prices of audio technology is increasingly used, but you must have a good knowledge of the material and good equipment.

It rarely has expensive devices and relies mostly on digital technologies.







Donato Masci Doubts about rec studios classification

Spontaneous doubts about classification and nature of the different types of recording studios

- A. if you do not record anymore in your studio, can we still talk about "recording studio"? *music production studio is better*
- B. if a top artist/producer has a home studio with highest level technology, can we call it "home studio"? the word "home" is misleading
- C. is a DJ studio a home or project studio?
- D. if you are able to get to the final result with the home studio, is it therefore a project studio?
- E. what is the real difference now between the project studio and the top studio?



Project Studio

nothing? controller? small analogue consoles

<u>digital</u> (DJ and small studios) analog (with summing mixers or small analog consoles)

(generally) near / mid field sometimes small big monitors (DJs), often not flush mounted

many preamps, 500 series lunchbox, compressors, equalizers, someone has some mastering outboard

few but good, if necessary

Top Studio

Console	Analog Console (SSL, NEVE, Audient)
Sum	<u>Analog</u> sum (console) or other summing mixers
Monitors	Big monitor (flush mounted) + near / mid field
Outboard	Some preamps (most are on the console) compressors, equalisers
Microphones	great equipment to meet any need



Costs?! €\$£¥







Audio equipment type

analogue	analogue	analogue or	analogue console only top stud
console	console	digital console	digital mixers, controllers
tape recorder	tape recorder + digital recorder	digital recorder	plugin and digital recorder

Audio equipment costs K€					
Audio equipment costs KE					
Тор	500÷1000+	500÷1000+	250÷800+		
Project	_	100÷250	50÷250		
Home	_	_	10÷50		
	1995		2005		
Golden disk	50.000		40.000		
Platinum disk	100.000		80.000		

dios	analogue console only top studios digital mixers, controllers rediscovery of the modular analogue outboard, [analog 500 series (API lunchbox)]	analogue console only top studios digital mixers, controllers + analogue outboard (pre/sum/eq/comp)	
	plugin and digital recorder	plugin and digital recorder	
	appearance of may mastering studios	DJ producers with only mac and audio interface	

200÷800+	150÷500+	100÷500+
30÷200	30÷150	25÷100
8÷30	5÷30	5÷25
2008	2010	2014
35.000	30.000	25.000
35.000 70.000	30.000 60.000	25.000 50.000



Audio equipment typeanalogue
consoleanalogue or
digital consoleanalogue console only top stue
digital mixers, controllerstape recordertape recorder +
digital recorderdigital recorderplugin and digital recorder

Audio equipment costs K€						
Тор	500÷1000+	500÷1000+	250÷800+			
Project	-	100÷250	50÷250			
Home	_	-	10÷50			
	1995		2005			
Golden disk	50.000		40.000			
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udios	analogue console only top studios
	digital mixers, controllers
	rediscovery of the modular analogue outboard,
	[analog 500 series (API lunchbox)]

plugin and digital recorder

appearance of may mastering studios

analogue console only top studios digital mixers, controllers + analogue outboard (pre/sum/eq/comp...)

plugin and digital recorder

DJ producers with only mac and audio interface





Studio construction costs K€						
Тор	200÷1000+	200÷1000+	200÷1000+	200÷1000+	200÷1000+	200÷1000+
Project	_	25÷200	25÷200	25÷200	20÷150	20÷100
Home	-	-	8÷25	8÷25	8÷20	8÷20
Audio equipn	nent costs K€					
Тор	500÷1000+	500÷1000+	250÷800+	200÷800+	150÷500+	100÷500+
Project	-	100÷250	50÷250	30÷200	30÷150	25÷100
Home	-	-	10÷50	8÷30	5÷30	5÷25
	1995		2005	2008	2010	2014
Golden						
disk	50.000		40.000	35.000	30.000	25.000
Platinum disk	100.000		80.000	70.000	60.000	50.000



Studio construction costs K€						
Тор	200÷1000+	200÷1000+	200÷1000+	200÷1000+	200÷1000+	200÷1000+
Project	_	25÷200	25÷200	25÷200	20÷150	20÷100
Home	-	_	8÷25	8÷25	8÷20	8÷20
Audio equipn	nent costs K€					
Тор	500÷1000+	500÷1000+	250÷800+	200÷800+	150÷500+	
Project	-	100÷250	50÷250	30÷200	30÷150	25÷100
Home	_	-	10÷50	8÷30	5÷30	5÷25
	1995		2005	2008	2010	2014
Golden lisk	50.000		40.000	35.000	30.000	25.000
Platinum disk	100.000		80.000	70.000	60.000	50.000



Studio construction costs K€ Тор 200÷1000+ 200÷1000+ 200÷1000+ Project 25÷200 25÷200 -Home 8÷25 -Audio equipment costs K€ Тор 250÷800+ 500÷1000+ 500÷1000+ Project 100÷250 50÷250 -Home 10÷50 -2005 1995 Daily income € Тор 600÷1500 600÷2000 Project 300÷600 -Home --

25÷200	20÷150	20÷100
8÷25	8÷20	8÷20
200÷800+	150÷500+	100÷500+
30÷200	30÷150	25÷100
8÷30	5÷30	5÷25
8÷30 2008	5÷30 2010	5÷25 2014
2008	2010	2014
2008 600÷1500	2010 500÷1000	2014 •
2008	2010	2014
2008 600÷1500	2010 500÷1000	2014 •

200÷1000+	200÷1000+	200÷1000+
25÷200	20÷150	20÷100
8÷25	8÷20	8÷20



Studio construction costs K€

Тор	200÷1000+	200÷1000+	200÷1000+
Project	_	25÷200	25÷200
Home	-	-	8÷25

Audio equipment costs K€ –

Тор	500÷1000+	500÷1000+	250÷800+
Project	-	100÷250	50÷250
Home	-	-	10÷50
	1995		2005

Daily income €

Тор	600÷2000	600÷1500
Project	-	300÷600
Home	-	-

8÷25	8÷20	8÷20
200÷800+	150÷500+	100÷500+
30÷200	30÷150	25÷100
8÷30	5÷30	5÷25
2008	2010	2014
600÷1500	500÷1000	400÷800
350÷600	300÷500	250÷400
150÷300	120÷300	100÷250
		28

200÷1000+

20÷150

200÷1000+

25÷200

200÷1000+

20÷100



Case studies





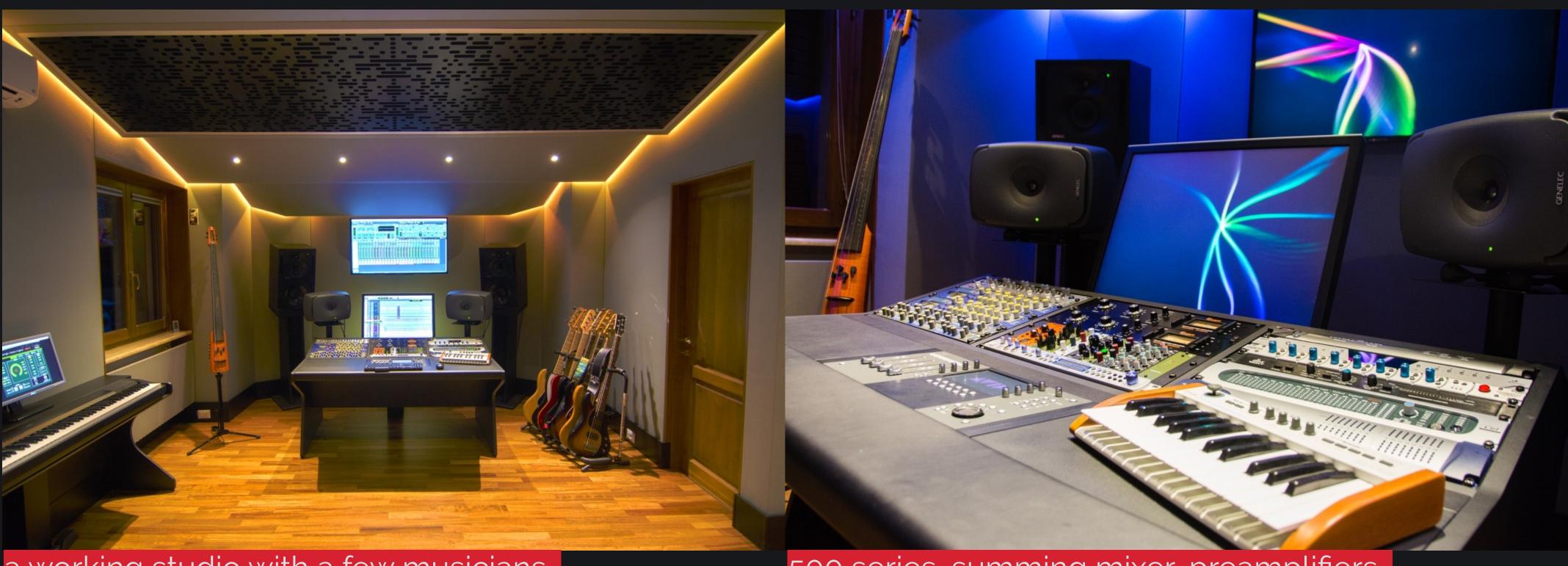
Ronny Aglietti

Monte San Savino — AR

Project studio owned by a bass-player (Alessandra Amoroso)







a working studio with a few musicians, small ensembles, to record individual instruments and prepare productions, up to the final mix for lo-mid productions Project studio owned by a bass-player (Alessandra Amoroso)

500 series, summing mixer, preamplifiers, analog outboard (SSL, API, NEVE, IGS, Warm audio), controller, audio system with (auto)calibration



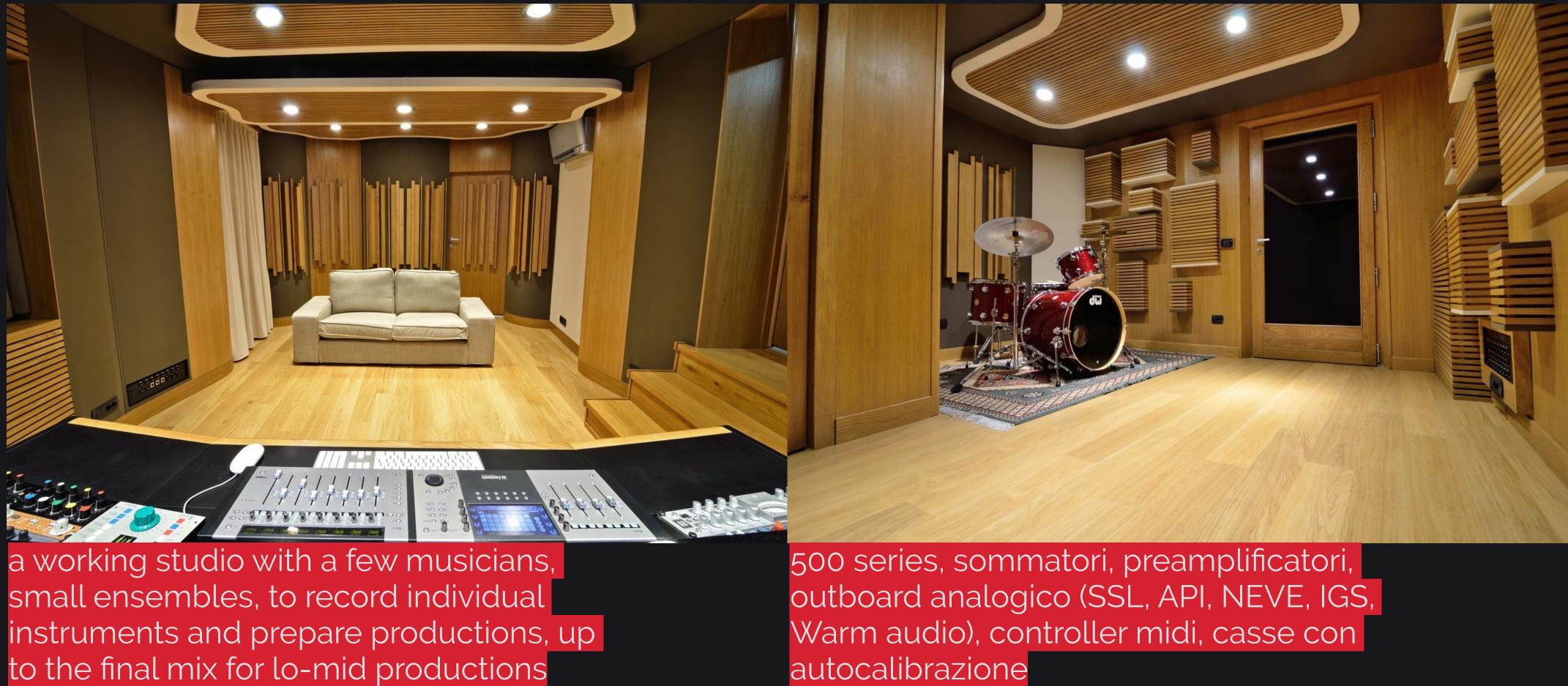
Bagnoli bros. studio

Castelnovo ne' Monti — RE

Project studio owned by a young engineer



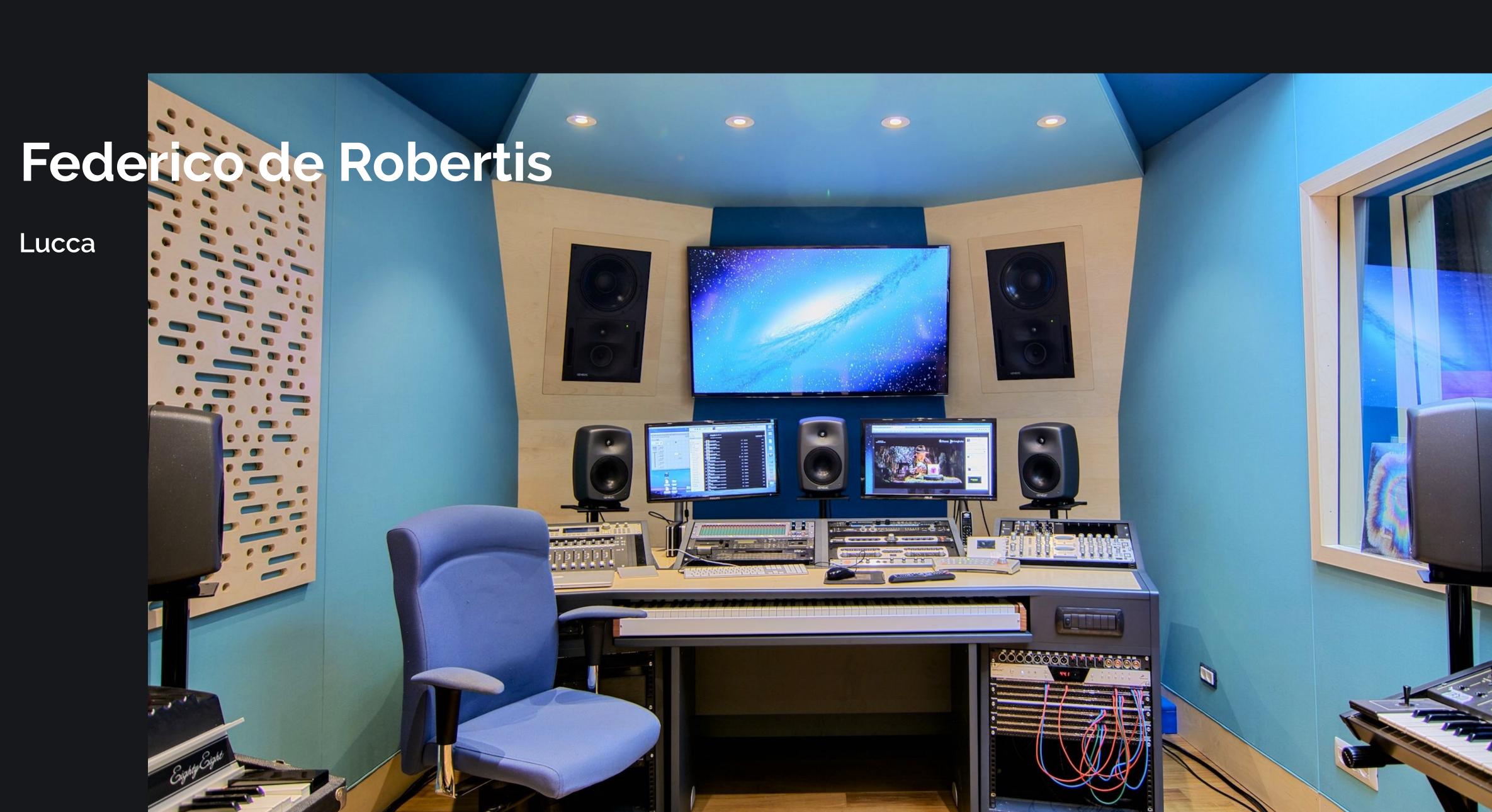




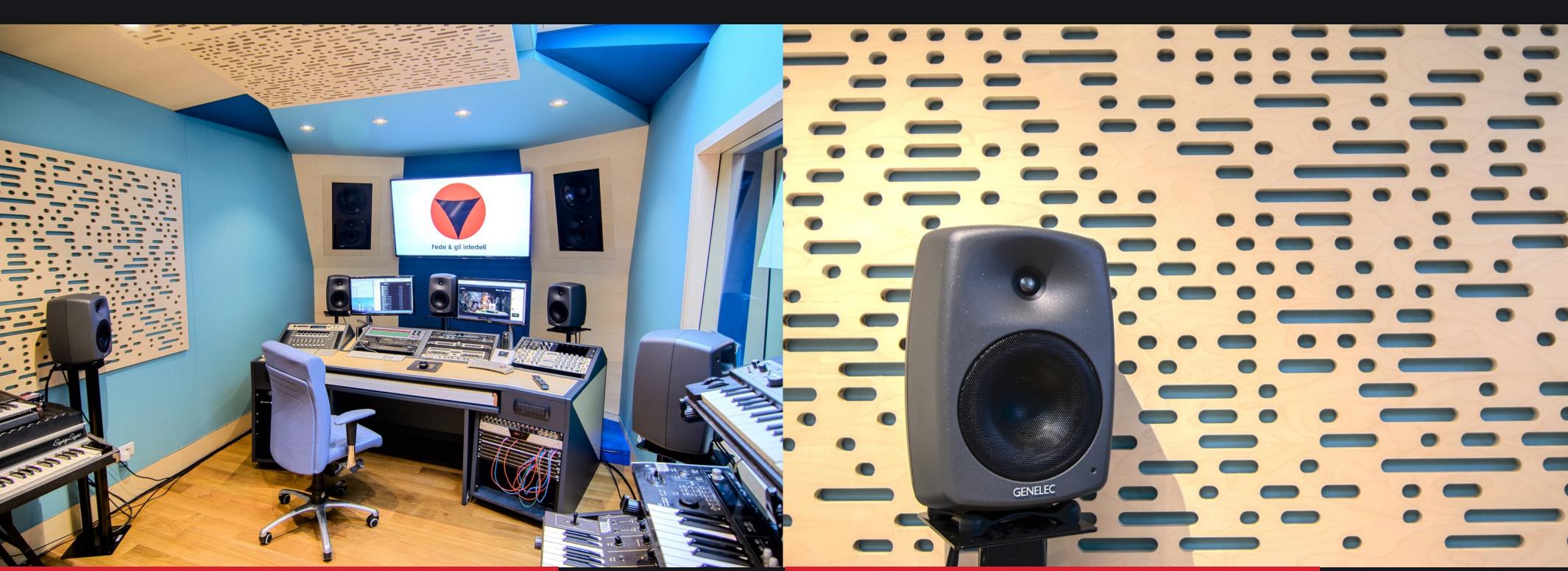
Project studio owned by a young engineer

autocalibrazione









a working studio with a few musicians, small ensembles, to record individual instruments and prepare productions, up to the final mix for lo-mid productions Dj-ing Project studio owned by a composer (film) (music per Gabriele Salvatores)

masterkeyboards, rhodes and piano, acoustic instruments, summing mixer, preamplifiers, analogue outboards, midi controllers, systems and high-level audio interfaces 2.1 and 5.1



Vinai

Brescia



Project studio owned by DJ EDM top100DJ #37





a place to work essentially in two, no computer, midi keyboard for virtual recordings, no analogue, "in the box" mix instruments, audio interface and highlevel studio monitors

Project studio owned by DJ EDM top100DJ #37

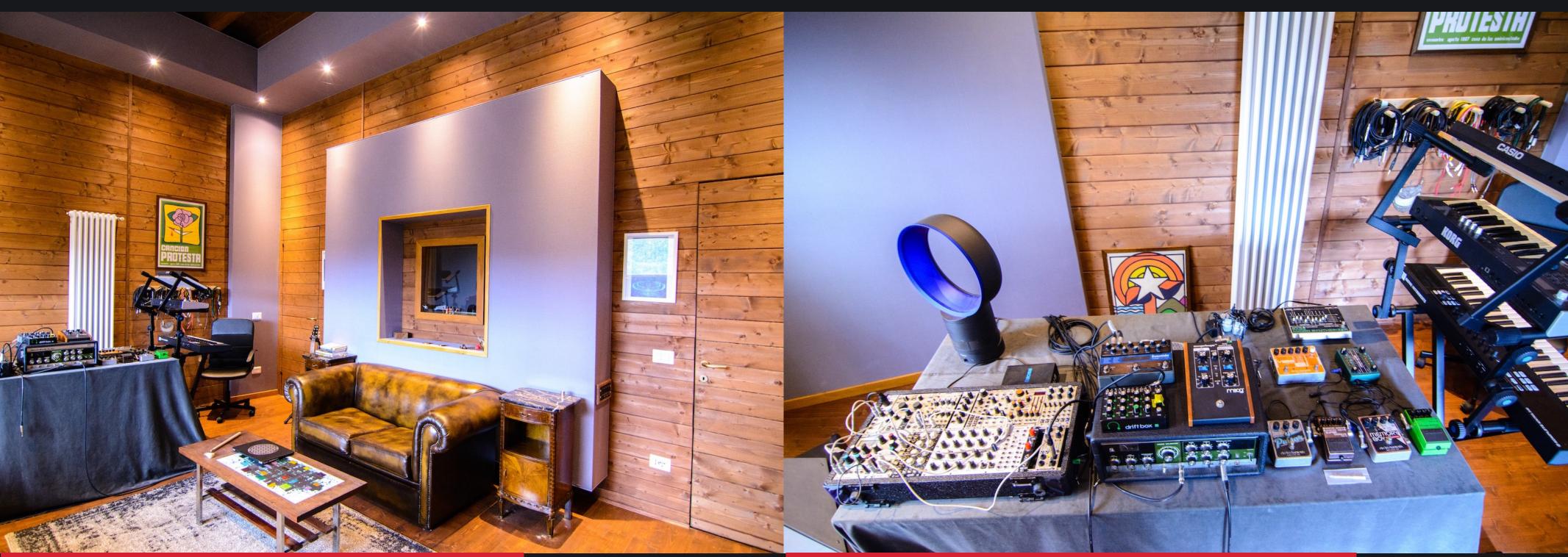






Project studio owned by DJ/producer Damian Lazarus





a place to work in small ensembles, produce, play and arrange; isobooth to record voices and individual instruments; "homy" aesthetics; "in the box" mix.

Project studio owned by DJ/producer Damian Lazarus

computers, many keyboards, analogue and digital effects, electric and electronic acoustic instruments, audio interface and high-level listening





Electronic music production facility owned and managed by Maxx Monopoli





voices and individual instruments. Big monitors and small analog console.

Electronic music production facility owned and managed by Maxx Monopoli



Magnitudo Studio

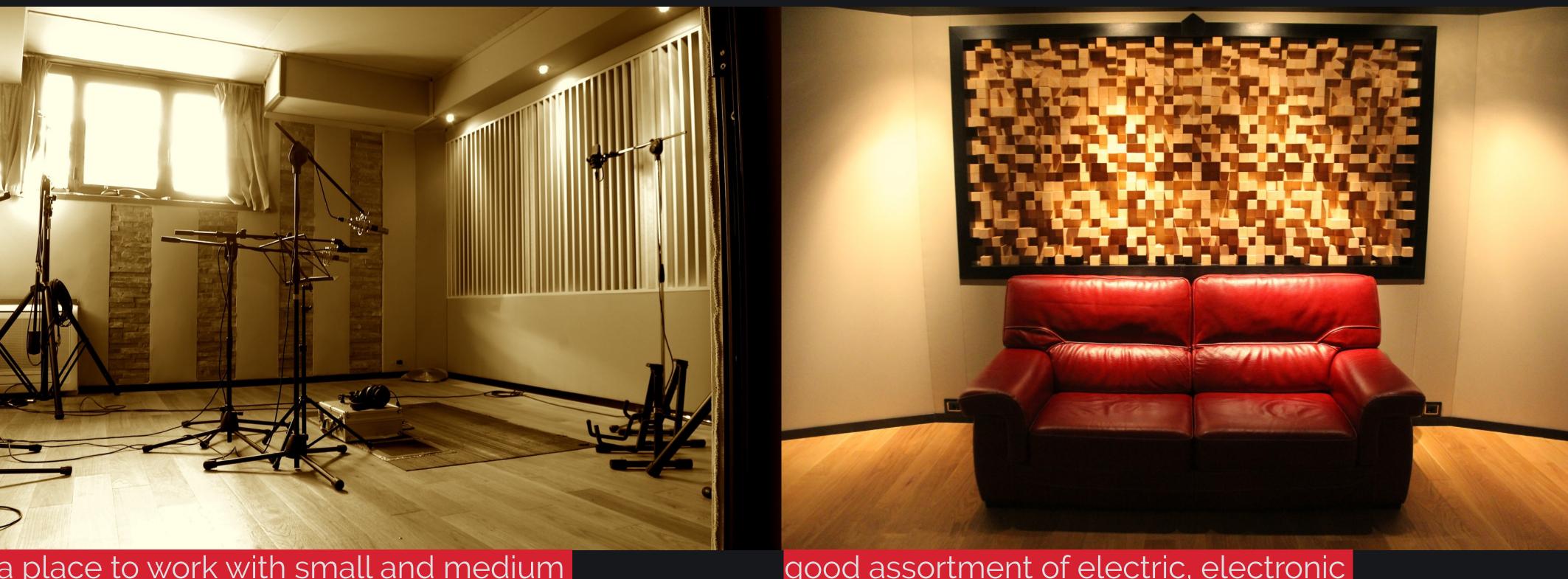
Ghezzano – Pl



Project(+) Studio







a place to work with small and medium ensembles, produce, play and arrange; recording room to record small bands and drums.

Project(+) Studio



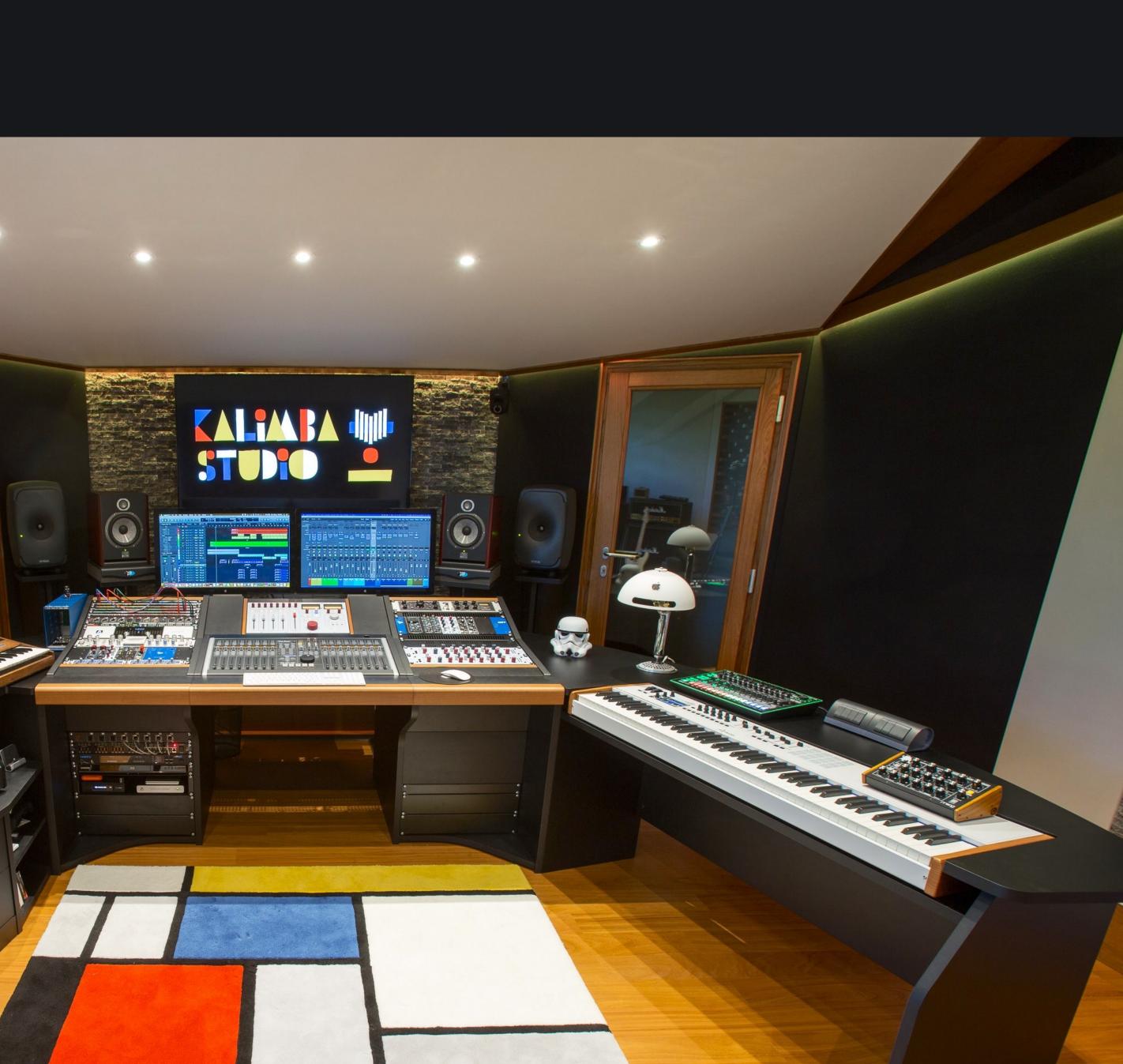
good assortment of electric, electronic and acoustic instruments, analogue outboard and vintage equipment. Small Genelec big monitors and small analogue mixer.



Kalimba Studio

Monselice – PD

Project(+) Studio







a place to work with small and medium ensembles, produce, play and arrange; isobooth to record voices and individual instruments; recording room, "homy" aesthetics; analogical mix.

Project(+) Studio

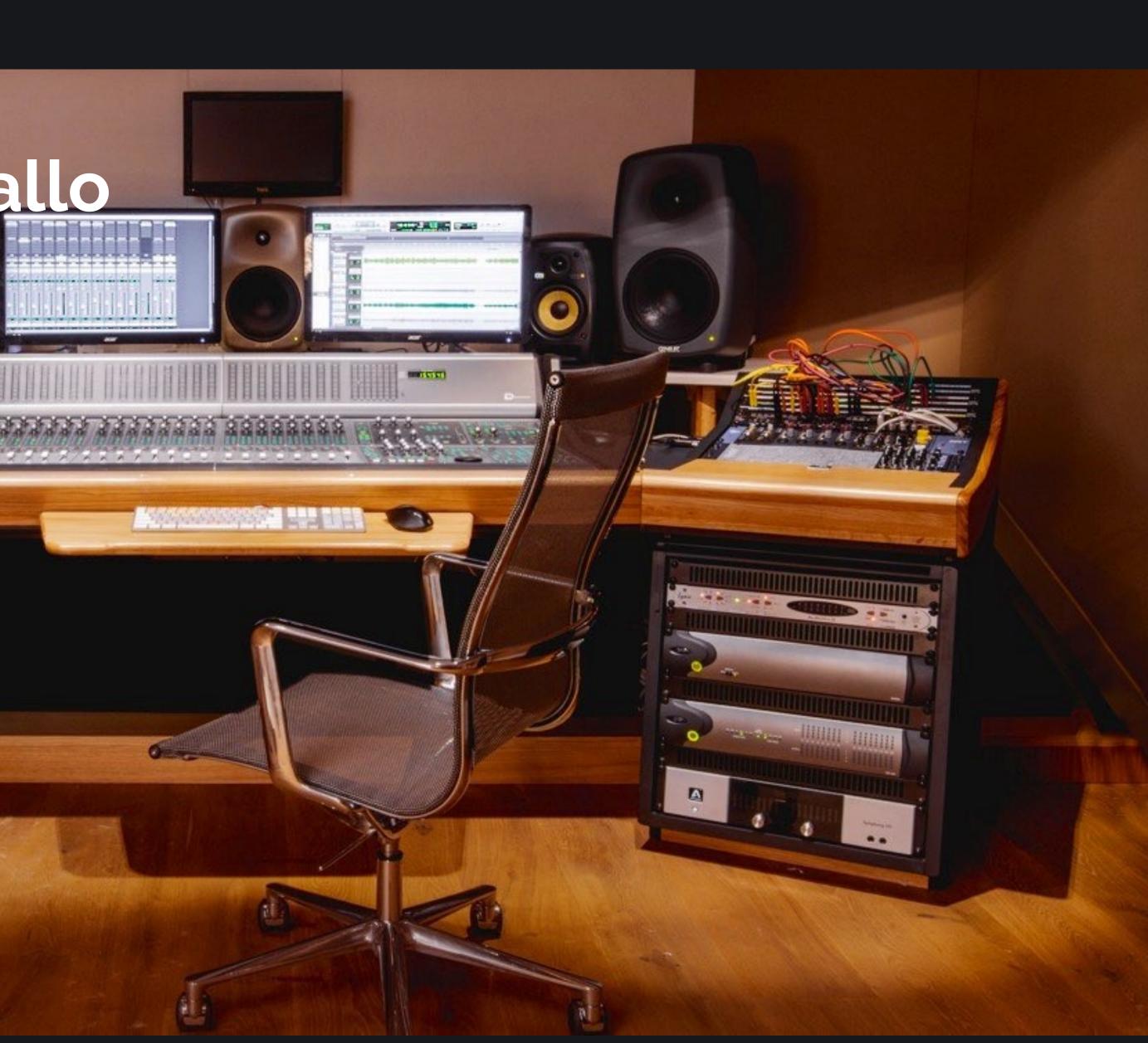
large assortment of electric and electronic acoustic instruments, analogue outboard and vintage equipment.



Officina Sonora del Bigallo

1.1

Bagno a Ripoli – FI

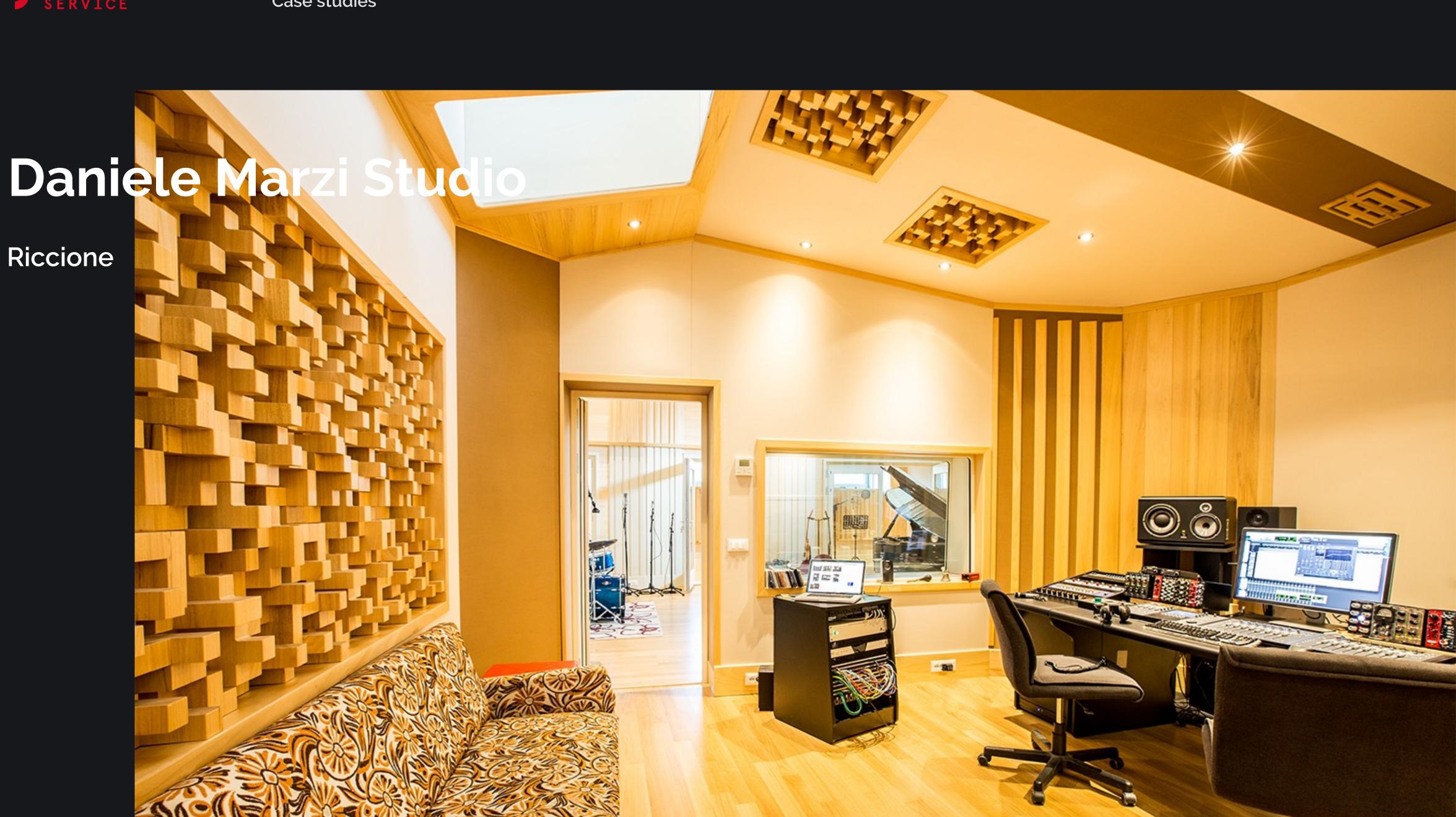




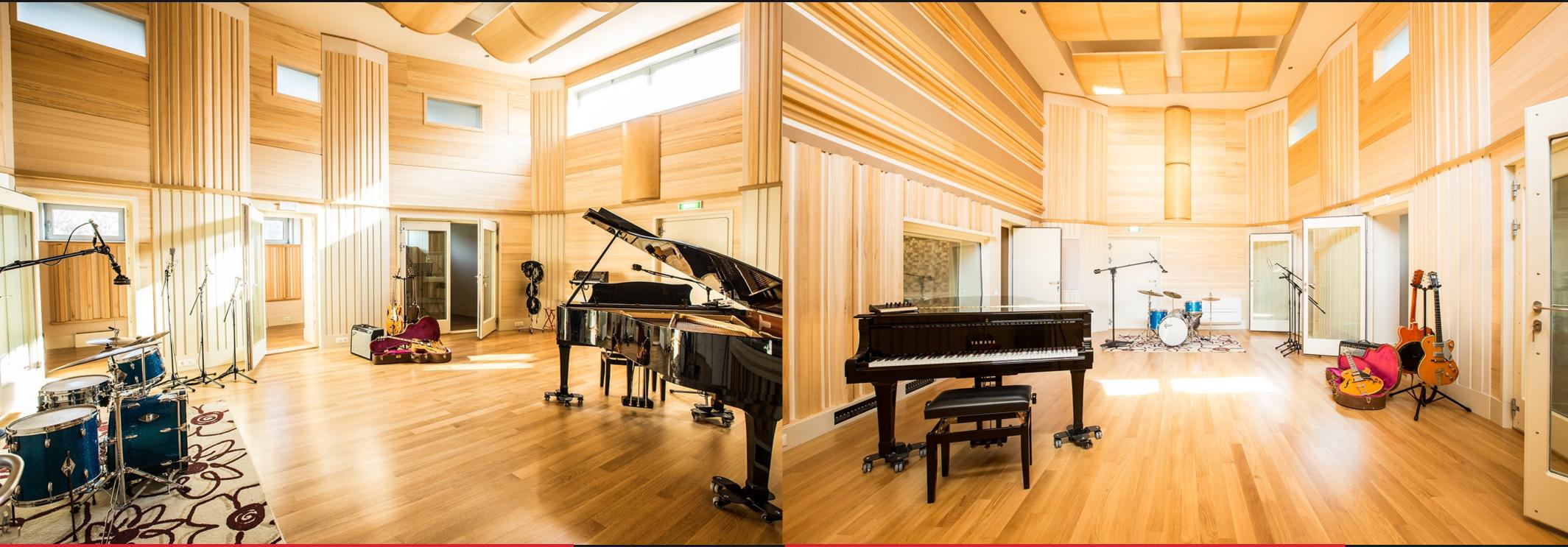


a space to work with small, medium and large ensembles, produce, play and arrange; great recording room, iso booth. good assortment of electric, electronic and acoustic instruments, analogue outboard and vintage equipment. 5.1 Genelec system and ICON controller.









Orchestral room with piano, suitable for jazz with 4 iso booth, plenty of brightness in the hall, great visibility among the musicians.

Project studio control room, no analog console, no big monitor, good assortment of electric, electronic and acoustic instruments, analogue outboard and vintage equipment.



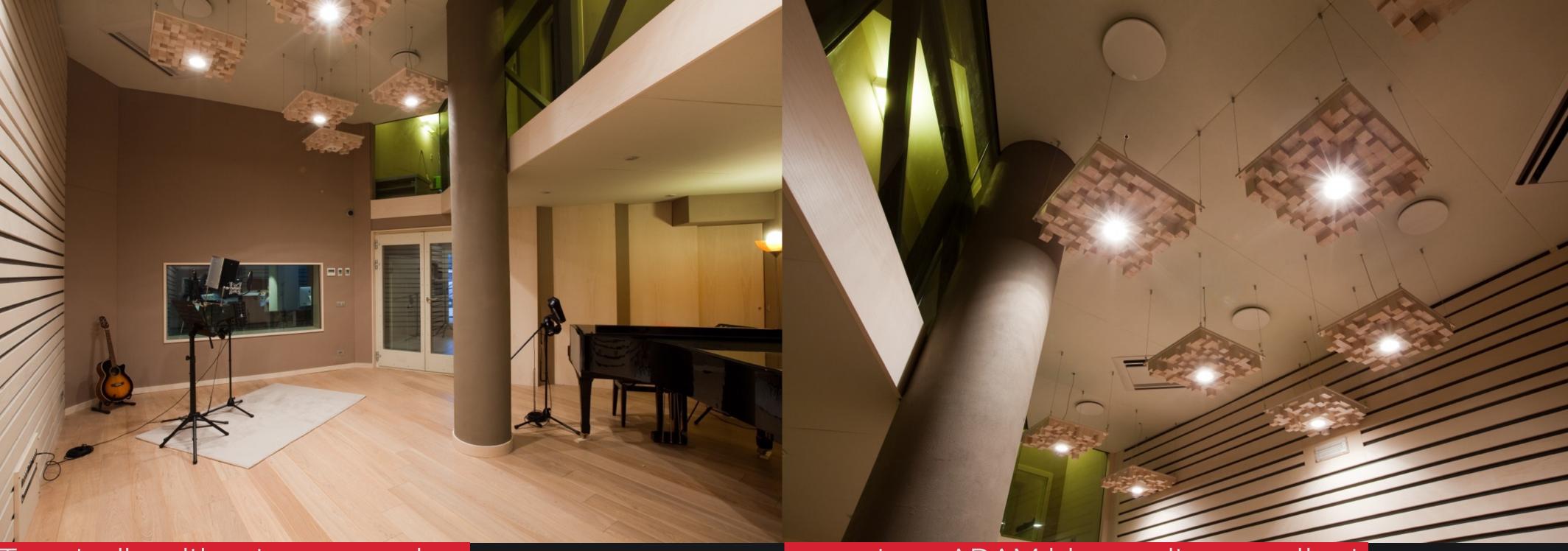
House of Glass Gianni Bini

Viareggio

Top Studio, mix mastering e DJing – Raffaella Carrà, Mario Biondi, etc.







Top studio without compromise: analog console, big monitor, highest level outboard, high room with piano and two iso-booth.

Top Studio, mix mastering e DJing – Raffaella Carrà, Mario Biondi, etc.



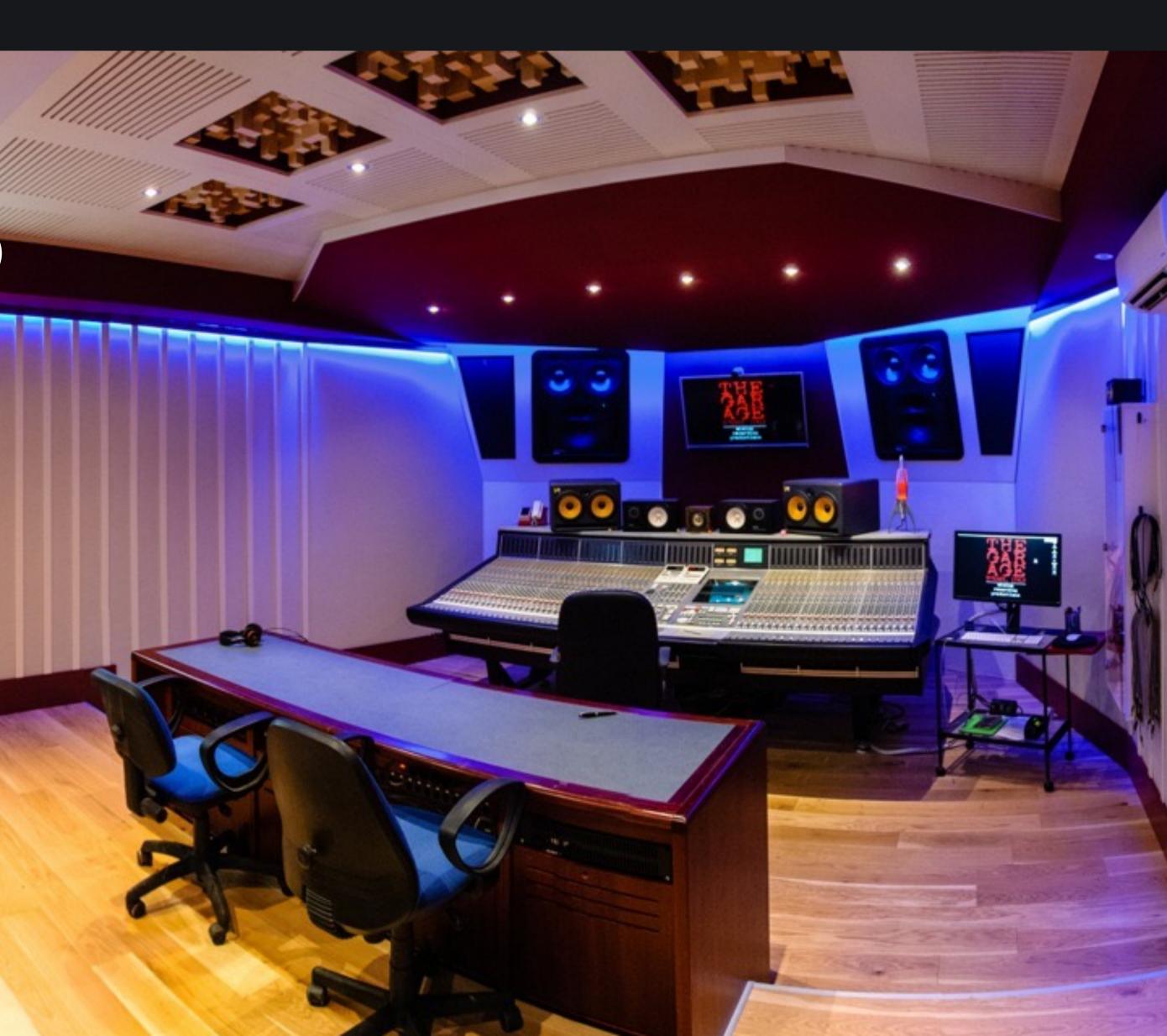
5.1 system, ADAM big monitor, excellent range of microphones, analogue outboard and instruments.



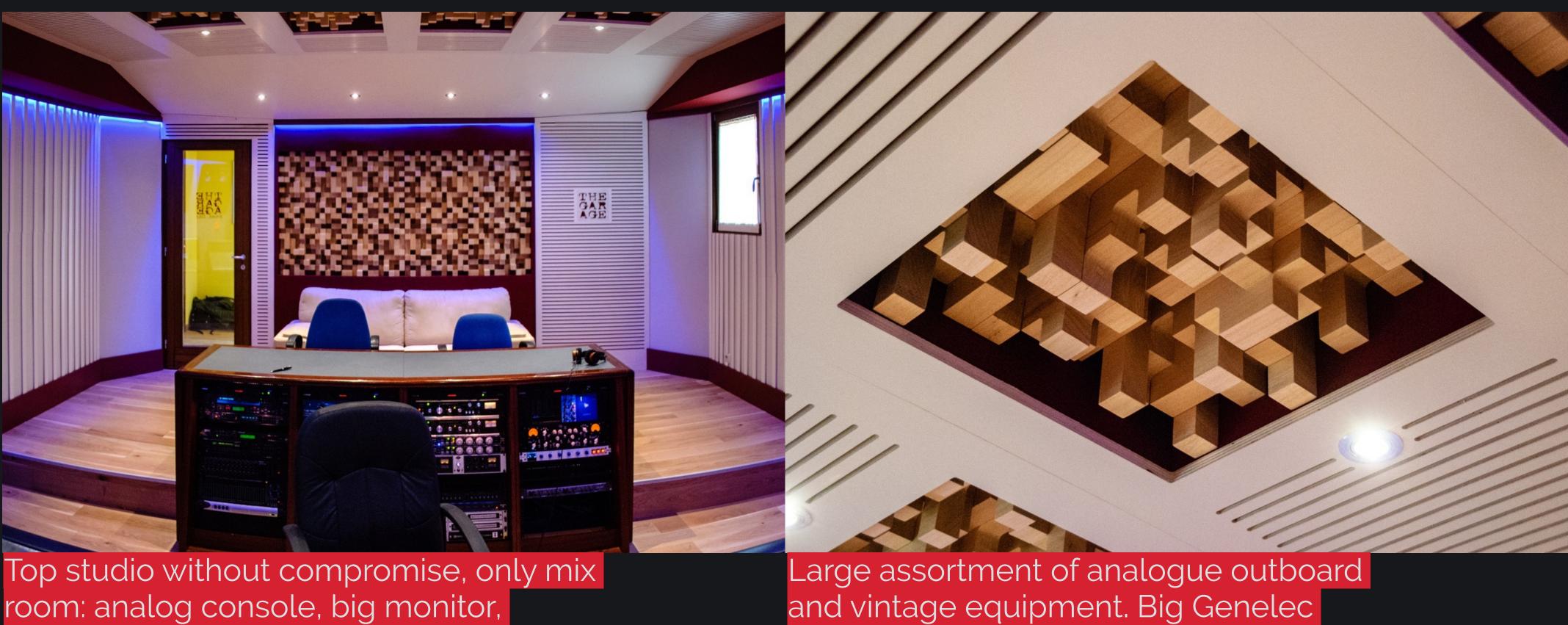
The Garage Studio (ex Fabrizio Simoncioni)

Civitella val di Chiana

Top Studio – ex Fabrizio Simoncioni Negrita etc.







monitors.

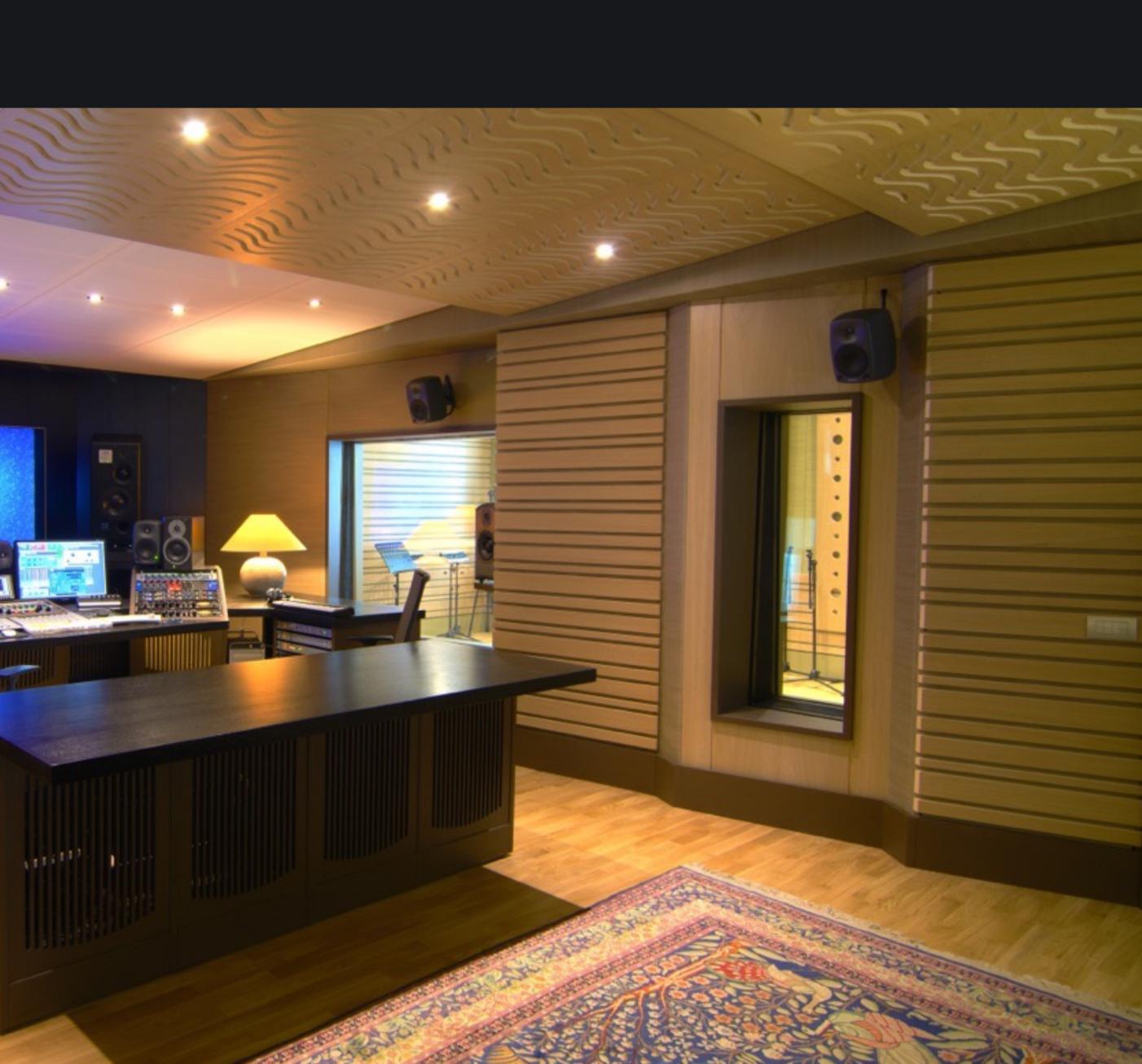
Top studio without compromise, only mix room: analog console, big monitor, outboard of the highest level. Two small accessory shooting rooms. Top Studio – ex Fabrizio Simoncioni Negrita etc.



Mulinetti Alberto Parodi

Genova

Top Studio – Alberto Parodi Moody Blues, Renato Zero etc.







so with some structural compromise (height etc.), no analog console; 2 shooting rooms + iso-booth.

Top Studio – Alberto Parodi Moody Blues, Renato Zero etc.



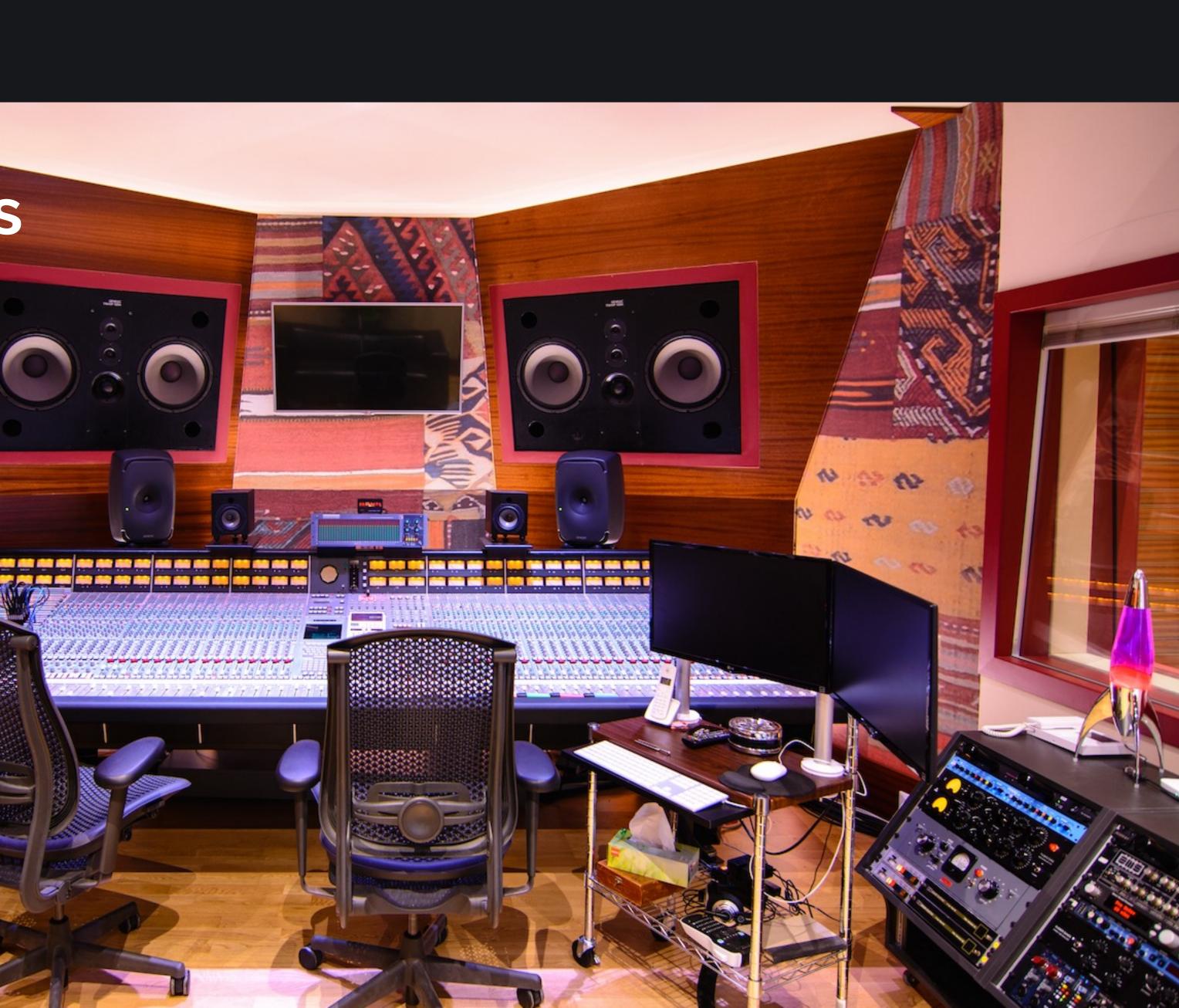
range of microphones, analog outboard and vintage equipment combined with the latest generation solutions like the Genelec 8351.



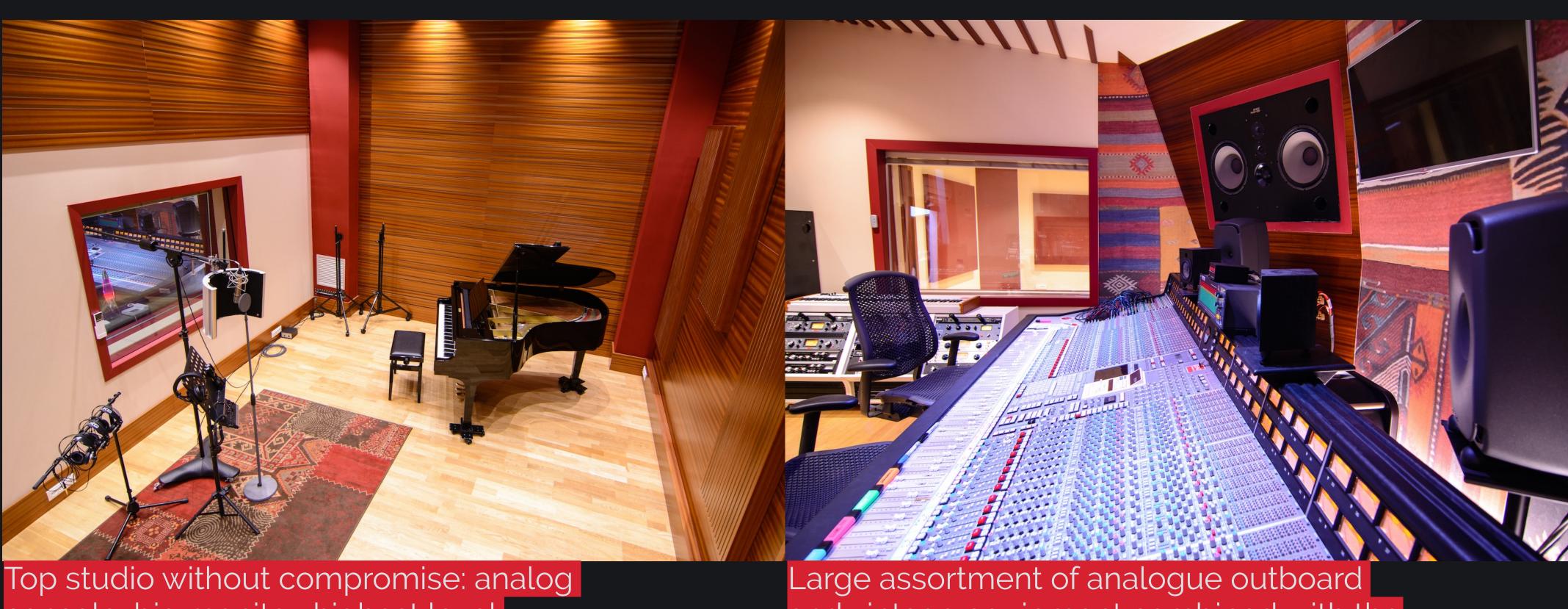
D:POT recording arts Fabrizio Simoncioni

Prato

Top Studio – Fabrizio Simoncioni Litfiba etc.







console, big monitor, highest level outboard, live room with piano and a dryer recording room B.

Top Studio – Fabrizio Simoncioni Litfiba etc.

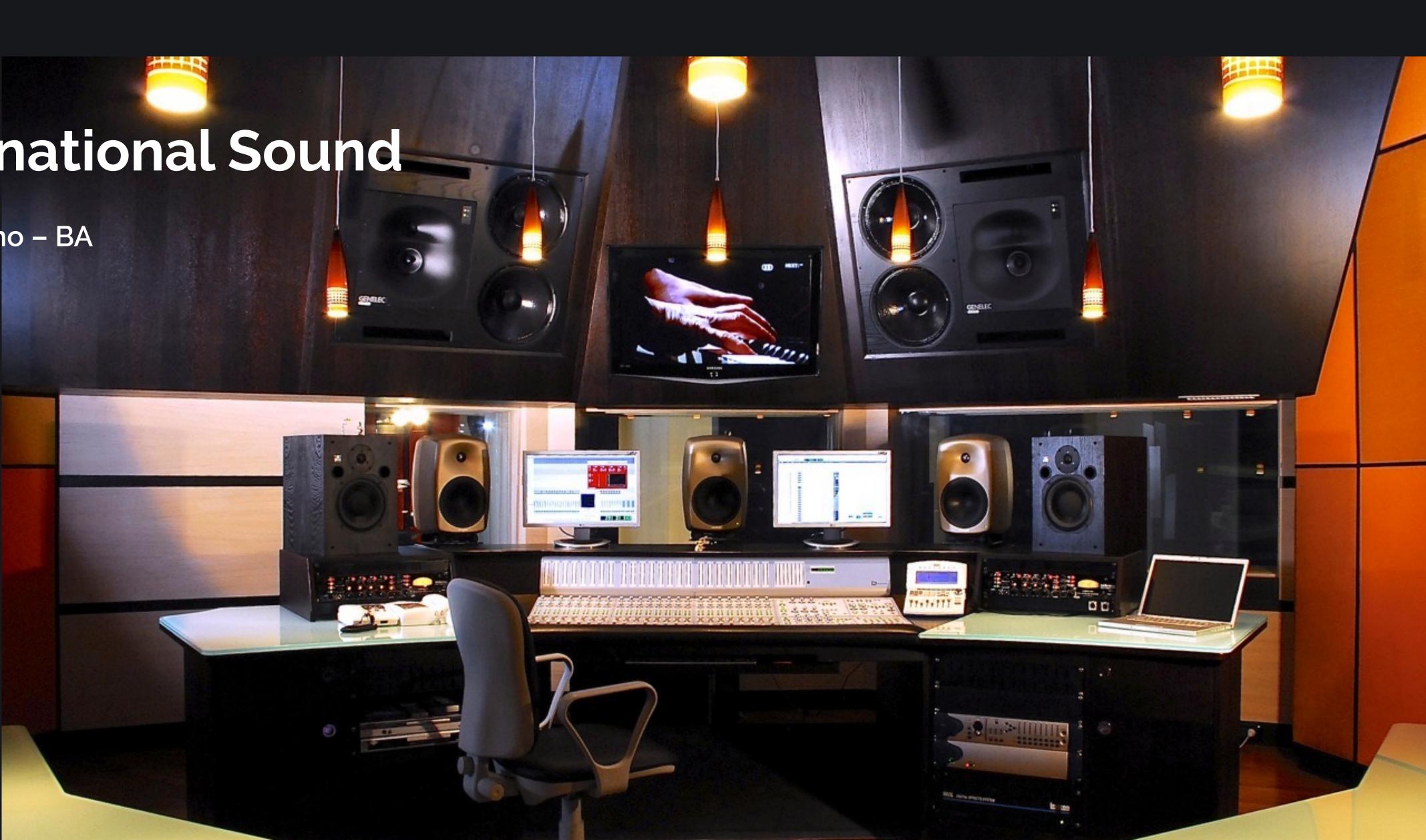


and vintage equipment combined with the latest generation solutions like the Genelec 8351.



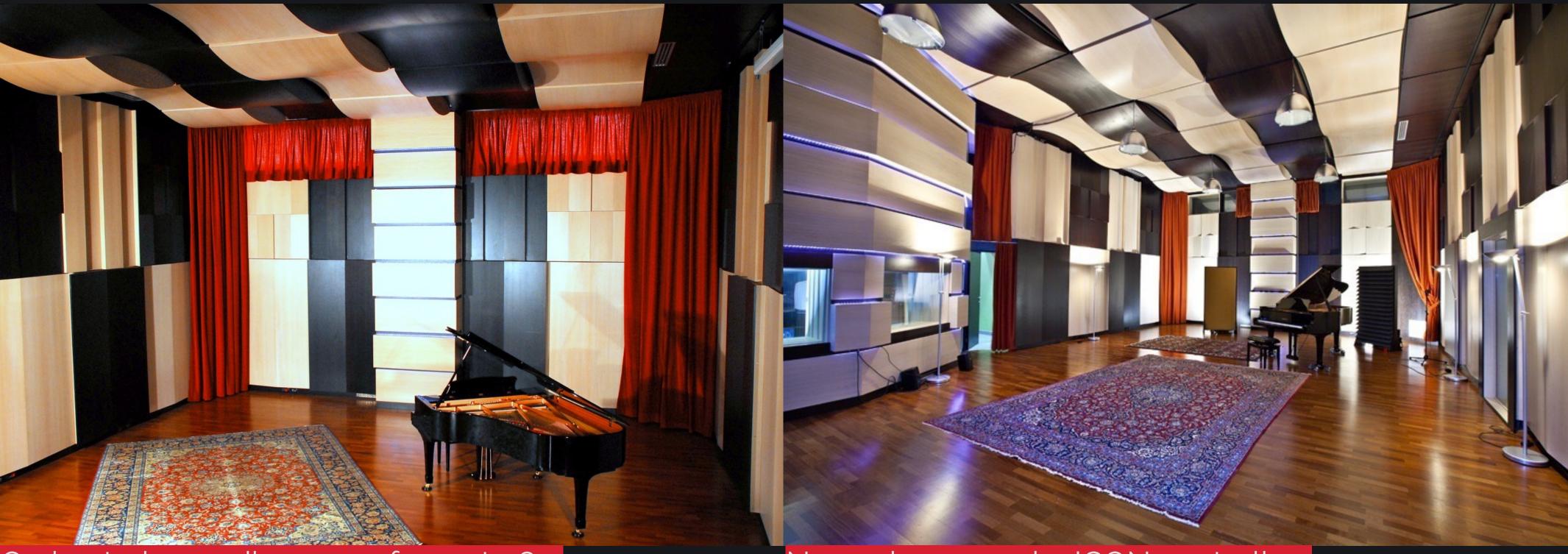
International Sound

Conversano – BA



Top Studio – orchestral (scoring room)





Orchestral recording room for up to 80 musicians, with piano; iso booth to record voices and individual instruments.

Top Studio – orchestral (scoring room)



No analog console, ICON controller, Genelec big monitor, 5.1 listening system.

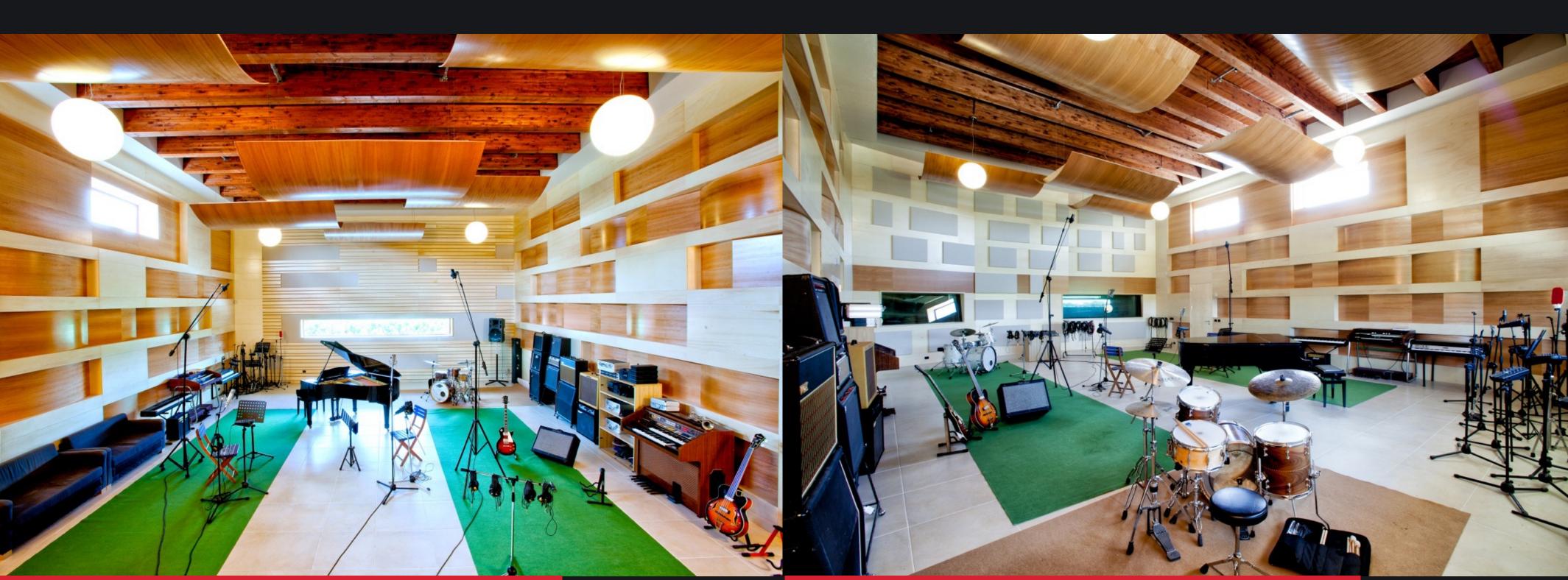




Guagnano





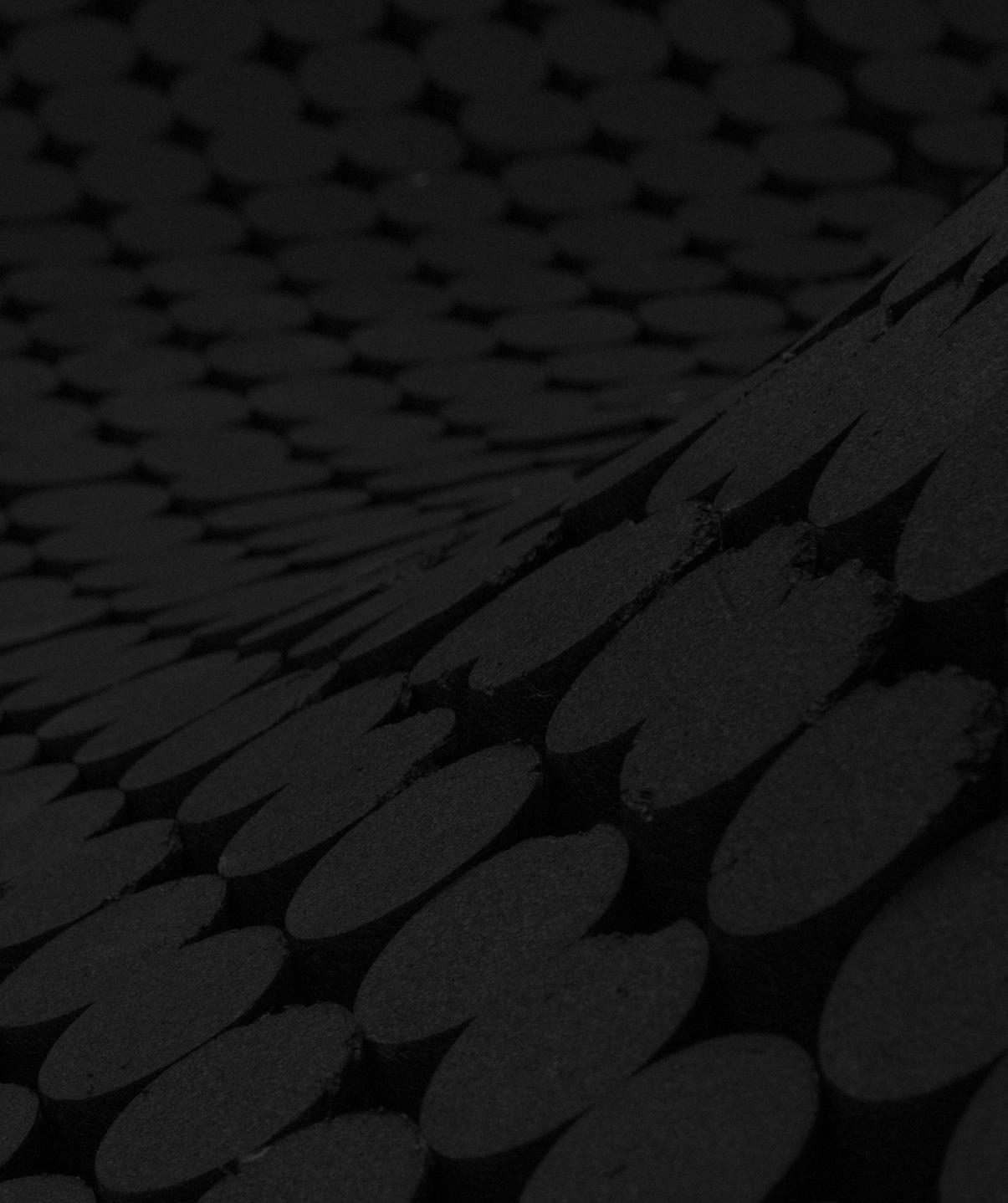


Orchestral recording room for up to 80 musicians, B-room for dry recording (voices and single instruments), Amek analogue mixer, Dynaudio big monitor. Top Studio – orchestral (scoring room)

Large assortment of electric, electronic and acoustic instruments, analogue outboard and vintage equipment.



Conclusions





Donato Masci Conclusions

Conclusions:

- A. It is difficult to establish the differences between different types of studio (top/ project/home);
- B. the general trend is "rooms getting smaller";
- C. recordings quality suffers in my opinion, mainly due to lack of big monitors, even if analog consoles can be easily replaced by summing mixers etc.;
- D. due to the smaller environments, the acoustic design need to adapt to this phenomenon;
- E. modern calibration and active reverberation control systems might be useful to improve listening avoiding structural interventions.





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Donato Masci Bibliography

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