

705	ORBComm FM-13	ORBComm Inc.	USA	C	Communications	LEO	45	1998
706	ORBComm FM-14	ORBComm Inc.	USA	C	Communications	LEO	45	1998
707	ORBComm FM-15	ORBComm Inc.	USA	C	Communications	LEO	45	1998
708	ORBComm FM-16	ORBComm Inc.	USA	C	Communications	LEO	45	1998
709	ORBComm FM-18	ORBComm Inc.	USA	C	Communications	LEO	45	1998
710	ORBComm FM-19	ORBComm Inc.	USA	C	Communications	LEO	45	1998
711	ORBComm FM-20	ORBComm Inc.	USA	C	Communications	LEO	45	1998
712	ORBComm FM-22	ORBComm Inc.	USA	C	Communications	LEO	45	1998
713	ORBComm FM-23	ORBComm Inc.	USA	C	Communications	LEO	45	1998
714	ORBComm FM-25	ORBComm Inc.	USA	C	Communications	LEO	45	1998
715	ORBComm FM-27	ORBComm Inc.	USA	C	Communications	LEO	45	1998
716	ORBComm FM-30	ORBComm Inc.	USA	C	Communications	LEO	45	1999
717	ORBComm FM-31	ORBComm Inc.	USA	C	Communications	LEO	45	1999
718	ORBComm FM-32	ORBComm Inc.	USA	C	Communications	LEO	45	1999
719	ORBComm FM-34	ORBComm Inc.	USA	C	Communications	LEO	45	1999
720	ORBComm FM-35	ORBComm Inc.	USA	C	Communications	LEO	45	1999
721	ORBComm FM-36	ORBComm Inc.	USA	C	Communications	LEO	45	1999
722	ORBComm FM-4	ORBComm Inc.	USA	C	Communications	LEO	45	1998
723	ORBComm FM-5	ORBComm Inc.	USA	C	Communications	LEO	45	1997
724	ORBComm FM-6	ORBComm Inc.	USA	C	Communications	LEO	45	1997
725	ORBComm FM-7	ORBComm Inc.	USA	C	Communications	LEO	45	1997

725 Reconnaissance for US Central Command in Afghanistan and Central Asia.

726	ORBComm FM-8	ORBComm Inc.	USA	C	Communications	LEO	45	1997
727	ORBComm FM-9	ORBComm Inc.	USA	C	Communications	LEO	45	1997
728	USA 231	U.S. Air Force/ DoD	USA	M	Reconnaissance	LEO	434	2011
729	Ørsted	DMI	Denmark	G	Earth Science	LEO	61	1999
730	Paksat-1R	SUPARCO/PakSat International	Pakistan	G/C	Communications	GEO	5,120	2011
731	Palapa C2	PT Indosat	Indonesia	C	Communications	GEO	3,014	1996
732	Palapa D1	PT Indosat	Indonesia	C	Communications	GEO	4,100	2009
733	USA 207	Unknown US agency	USA	M	Communications	GEO		2009
734	LIDAR	PARASOL/CNES	France	G	Earth Science	LEO	120	2004
735	Cosmos 2389	Ministry of Defense	Russia	M	Navigation	LEO	825	2002
736	Cosmos 2398	Ministry of Defense	Russia	M	Navigation	LEO	820	2003
737	Cosmos 2361	Ministry of Defense	Russia	M	Navigation	LEO	795	1998
738	Cosmos 2366	Ministry of Defense	Russia	M	Navigation	LEO	795	1999
739	Cosmos 2378	Ministry of Defense	Russia	M	Navigation	LEO	825	2001
740	Cosmos 2407	Ministry of Defense	Russia	M	Navigation	LEO	825	2004
741	Cosmos 2414	Ministry of Defense	Russia	M	Navigation	LEO	825	2005
742	Cosmos 2429	Ministry of Defense	Russia	M	Navigation	LEO	810	2007
743	Cosmos 2454	Ministry of Defense	Russia	M	Navigation	LEO	810	2009
744	Cosmos 2463	Ministry of Defense	Russia	M	Navigation	LEO	820	2010
745	PCSat	US Naval Academy	USA	G	Tech Development	LEO	10	2001
746	Picard	CNES	France	G	Solar Physics	LEO	150	2010
747	Pléiades HR1	Ministry of Defense/CNES	AU/BE/SP/SE/FR/IT	G	Earth Observation	LEO	1,000	2011
748	Pcism	University of Tokyo	Japan	Civ	Earth Observation	LEO	5	2009
749	Pcoba 1	ESA	ESA	G	Tech Demonstration	LEO	100	2001
750	Pcoba 2	ESA	ESA	G	Tech Demonstration	LEO	130	2009
751	QueztSat-1	SES World Skies SES	USA	C	Communications	GEO	5,514	2011
752	Quickbird 2	DigitalGlobe Corporation	USA	C	Earth Observation	LEO		2001
753	QZS-1	JAXA	Japan	G	Navigation	GEO	4,000	2010
754	Radarsat-1	Radarsat International	Canada	C	Earth Observation	LEO	2,924	1995
755	Radarsat-2	Radarsat International	Canada	C	Earth Observation	LEO	2,924	2007
756	Radio-ROSTO	RS3A Control Station	Russia	Civ	Amateur Radio	MEQ		1994
757	Cosmos 2450	Ministry of Defense	Russia	M	Communications	GEO	2,400	2009
758	Cosmos 2434	Ministry of Defense	Russia	M	Communications	GEO	2,400	2007
759	Raduga 1-M2	Ministry of Defense	Russia	M	Communications	GEO	2,500	2010
760	USA 225	NRO	USA	M	Tech Development	LEO	350	2011
761	RapidEye-1	RapidEye AG	Germany	C	Earth Observation	LEO	175	2008
762	RapidEye-2	RapidEye AG	Germany	C	Earth Observation	LEO	175	2008
763	RapidEye-3	RapidEye AG	Germany	C	Earth Observation	LEO	175	2008

MODULATING NOISE

Interview with Gert-Jan Prins
Arie Altena

It's 31 October 2012, a Wednesday morning, and Gert-Jan Prins is in his studio on the Quellijnstraat in Amsterdam, talking about his work. He's standing at the workbench where he builds his small transmitters and receivers – there's a soldering iron, and resistors and little boxes filled with electronics. There's also a drum kit standing in the room – Prins has a background in drumming, and he played drums on the improvisation circuit for many years until his fascination for radio, noise and electronics gained the upper hand. Elsewhere in the studio there are all sorts of electronic equipment and a wall of analogue televisions that are used for performances by the Synchronator Orchestra, which had premiered two weeks earlier at the Kontraste Festival in Krems, Austria. Prins has deeply immersed himself in the phenomenon of noise, both as an artist and a musician, and his work makes electric space audible and palpable. He's on a quest to find the very essence

of the electronic signal. In his frequent musical performances he plays his self-made circuits and uses the sound to create moving images generated by the Synchronator, which he developed with Bas van Koolwijk. 2008 saw the release of his *Break Before Make* album through Mego. His work also appears on the art circuit. An example is his *Cavity*, an electric space built from sheet copper at Onomatopee in Eindhoven, the Netherlands.

Arie Altena On 3 November 2012 you'll be presenting your work at De Player in Rotterdam, as part of the SESD [Sculptural Electronic Sound Discs] project. What did you make for it?

Gert-Jan Prins The SESD project was conceived by Peter Fengler and the other artists are Gijs Gieskes, Tom Verbruggen and Dennis de Bel. We're each going to make a record with integrated electronics. We're going to cast the records ourselves. On mine there's a five-minute track I made with one of my own little transmitters. And then I solder my circuits onto it – exactly the same kind of transmitter as the one I used to make the track on the record. You can tune your radio to the transmitter so you can mix in the sound of the radio with the sound of

the record as you play it. It's quite possible that playing it on different record players will create different effects because the magnetic field of the record players motor might cause interference, for example. Some record players have solid metal turntables, while others are made entirely of plastic. So you can expand the sound to your own radio, thereby creating an extra layer.

AA It's the first time you're using the self-made circuit in this way. It's actually a component in a sound sculpture isn't it?

GJP Well of course I've thought before about making a series of the boxes I use and then selling them. There's been a trend over the last few years of makers selling their own custom-made electronics. Sometimes they're unique pieces, but other times they're produced as a series - like Bas van Koolwijk and I did with the Synchronator. The prototypes for the Synchronator were really beautiful, but we put them in a box so we could produce a series of them. The transmitter-receiver systems I build are purely about functionality. I arrange the components on a board, and it is what it is. It's all about functionality for me: it's got to make sound. There's no way I'd set them out differently on a board to make it look nicer. Of course I do like it that the battery I ordered for this transmitter looks a bit like a record player, but I ordered it because of its functionality, not its appearance.

AA Could you explain exactly what this transmitter consists of?

GJP There's a battery, a transistor, a few resistors and capacitors, a tuned circuit - a combination of coil and capacitor. It only lets through one specific frequency - in this case it's about 104 Mhz. The signal gets fed back by generating momentary negative resistance. The transistor actually

functions as a kind of pump. The components have been selected so that this gorgeous feedback isn't impeded in any way. It works better if you've got a good solid area that functions as a negative, such as a big copper PCB. I had a different solution initially, but there were insurmountable technical problems when it came to using it with FM radio. I got all sorts of parasitic effects, and that's exactly what I don't want.

AA When you build these circuits, are you searching for a particular sound?

GJP On the one hand I'm looking for a certain sound, but on the other it's uncontrollable. Some things you just can't reproduce. Sometimes it doesn't function well enough because it's not producing a strong enough signal or the signal disappears the moment you move your hand. That's not good, especially if you're selling the circuit as a product, as we are for this project.

AA Would you say this project is typical of your approach: trying things out, making circuits, seeing how they work?

GJP I've been doing this since I was 16. [Picks up a circuit board, switches on the radio and tunes it to the frequency of the small transmitter.] Right from the outset I was fascinated by the connection: you make something, you touch something in the circuit and that causes something to happen somewhere else. It's got scope. There are just so many aspects to it and if you just think about all the things you can do with it... You need incredible concentration to find out exactly what you can do with it. To most people, the sounds I make seem totally uncontrollable: it's noise that you'd rather shut out. These circuits already existed of course, it's just that I discovered there are so many other fascinating elements in them. The starting point in my work is

top - Tina Frank, Bas van Koolwijk and Gert-Jan Prins.

bottom - Justin Bennett, Tina Frank, Bas van Koolwijk, Jérôme Noetinger, Gert-Jan Prins and Billy Roisz. *The Synchronator Orchestra*, live performance at Sonic Acts, *The Dark Universe*, 2013. Originally commissioned for Kontraste Festival, *Electric Shadows*, Krems, 2012.



always at the micro level, and then I magnify that.

AA What do you use in your live set-up?

GJP I make a combination of the small transmitter and receiver. The receiver's output is fed back through the mixer to the transmitter so you get real feedback. That's the basic principle I used. One bottleneck in this kind of system is the delivery of sound to the transmitter. This is a very specific transition that you can experiment with a lot. You can, as it were, modulate the transmitter. For a long time I've been testing different ways that this sound signal influences the transmission signal. I use different ways of finding out exactly what's going on, and I've discovered that some set-ups deliver better quality and sounds than others.

AA Could you elaborate?

GJP I use the small receiver to pick up the self-generated FM signal and then I feed that back in again. I use radio technology as a complex filter for audio and bring the complexity of radio technology into the audio. There are lots of aspects to it. Each component behaves slightly differently. I've got transmitters built years ago that I still use. I've still got one with a test print in it that I got from a former neighbour. He developed it in 1994 for Philips for a car radio that could tune itself automatically to a frequency, so that when the car turned a corner and could no longer pick up a certain signal, it would still pick up the right frequency. Radio signals in between buildings sometimes move in remarkable ways. It gives me more ways of controlling what happens, and the quality of sound is really good, too. The receiver that this test print is in is a fusion of objects from various periods. One of the components is from a British modular DIY tuner from the 1970s. You used to be able to buy parts separately and connect them to each

other to make a really sensitive tuner - it was important back then because everything went through antennas. That's all disappeared now. The strange thing is that this combination of components still works really well. The quality of the receiver adds to the quality of the sound. I've been using this receiver for nearly twelve years now, with just a few tiny modifications. I always want to re-use boxes I made earlier. I've had some of the boxes - I mean the boxes you put the components in - for more than 30 years, but I use them again and again in different ways. Perhaps it's a romantic idea, but I think it's also a way of carrying history in what you do. I really like that, because you've already got a relationship with the material: you've had it in your hands before and then you make something new with it. But sometimes it's just because it's a functional box: nice and light with lots of holes.

AA How does it relate to electronic sound generated by sine waves and oscillators?

GJP There are several more steps to my transmitter-receiver system: first you transpose the signal to a totally different frequency and then you bring it back. That's what radio does, of course. It's a somewhat longer signal path. I'm fascinated by the idea that when you're working with FM radio and radio technology - with VHF in any case - you'll always have underlying noise: a base layer of noise. It's not present in purely electronic sound generated by a function generator using sine waves and square waves. You can compare that base layer of noise with water. When you generate noise using one of my small transmitters, you're transmitting it on an empty carrier wave. If you remove the carrier wave you get noise. Working with feedback systems, it's possible to incorporate the noise in the signal. You get all kinds of combinations that you couldn't easily generate any other way. I kept on using FM radio for practical

reasons. The noise sounds incredibly good I think. It's a physical and manageable format. Very occasionally you accidentally pick up a regular broadcast and that can add a playful element to the performance. It changes according to where you are. My live set is based on the FM wave band, usually on the quieter sections of it. When I'm playing in big cities I sometimes have to retune a bit so I don't suddenly get a blast of house music coming through.

AA Are you zooming in on the fundamentals of electronics?

GJP Electronics is all about raw materials: silicon, germanium, carbon, silver, copper. It's about electricity as a natural phenomenon. There's quite a bit of chemistry involved, too. Capacitors, resistors and transistors all contain various materials such as acids, all sorts of metals, tantalum, aluminium, gallium, arsenic. The circuits are miniature laboratories. Each of these materials makes a difference. That's fascinating to me. If it were purely about sound quality, capacitors would have to be huge blocks. That's only for audio freaks, because that kind of equipment isn't easy to carry around. I prefer making smaller devices. When performing I take a couple of extra ones with me, just in case one of them breaks down.

AA Originally, you were also a percussionist. And then you started combining your drumming and your noise-signal work.

GJP In the 1990s I did experimental recordings of percussion signals I played through my transmitter-receiver systems. I remember that if I recorded it to tape first it hugely increased the noise factor of the tape going through my system. That wasn't good. Then I passed the percussion sound through a DAT recorder to the transmitter, which made it possible to really fine tune the sound that was

produced between noise and no noise. I was able to create layers with them: mixes and distortions. You could move really nicely through the layers. You'd never have managed that with a tape recorder. That's the role of the recording device. Nowadays you've got Pro-Tools. It's just as easy. You could probably do it with telephone now. But in the mid-1990s you needed a studio.

AA At a certain point you developed the Synchronator with Bas van Koolwijk. And then you also started using visuals. How did that come about?

GJP In the mid-1990s I was going full steam ahead developing transmitter-receiver circuits for my sound research, mostly at STEIM in Amsterdam. I wanted to fully explore the simple principle and chart it, research it, develop it and change things about it. The signals I transmit can also be received by an analogue television. In that period I was curious what that would look like. If the transmitter is transmitting at 100 MHz, for instance, then you'll also hear it at the harmonic frequencies 200, 300, 400 and 500 MHz. Television can easily receive 500 MHz in the UHF band. What you see is a load of stripes. It looked really good and it created a logical connection between sound and image. I already had a couple of televisions I could mess around with. I found it too restricted after a while and started wondering how I could improve televisions. I examined the various components in a television, such as the tuner, and built my own system. But the problem was that it was impossible to record the images properly because there were no video recorders that could do it. So that was a limitation I encountered between 1998 and 2000. I did make a video for the local Amsterdam station Park TV, but I recorded that one by pointing a video camera at a monitor. Bart Rutten - who now works at the Stedelijk Museum - put me in contact with Bas van Koolwijk. I'd made a video for a compilation

DVD on the label run by the Italian Domenico Sciajno, and that led to Bart Rutten booking Bas and me for the 5DaysOff music festival in 2005. After that, Impakt in Utrecht offered Bas van Koolwijk a residency so we could develop a device that would be able to record the signal. We spent two months there, soldering the whole time. Bas knew a lot about video technology: about the display and about related parameters such as the synchronisation signal. I knew more about electronics, but not that much about pure video technology. I had to improve my skills considerably while I was there. We learned a lot from each other, and we still do. While we were there we developed a circuit we called the Synchronator, and a few years later we had a commercial version made. So our work focusing on recording a signal led to a device for synchronising image and sound.

AA I understand you're busy working on a prototype for the next Synchronator module.

GJP Yes. The Synchronator Color Control is a device that you connect to the Synchronator. It's got a stereo audio input, and you can use it to set the colours and intensity of the Synchronator's output signal. It's controlled manually using knobs. It's got three RGB outputs, which means you can feed it a stereo signal and the difference between left and right also gets translated into visual output. Although the first Synchronator could output red, green and blue, you needed three audio signals to do it. You could use an audio mixer to produce three signals, but it's more problematic and it's harder to control.

AA Am I right in thinking you focus much more on analogue than digital technology.

GJP Until now it's been mostly analogue - except for the recording. I need digital equipment for that.

We use an Arduino-related micro-controller with the Synchronator Color Control, partly to control the digital volume adjustments. And the internal synchronisation code for the Synchronator machine is digital. We use digital control codes, but the output is analogue.

AA Are your Synchronator performances entirely improvised, or do you plan a structure beforehand?

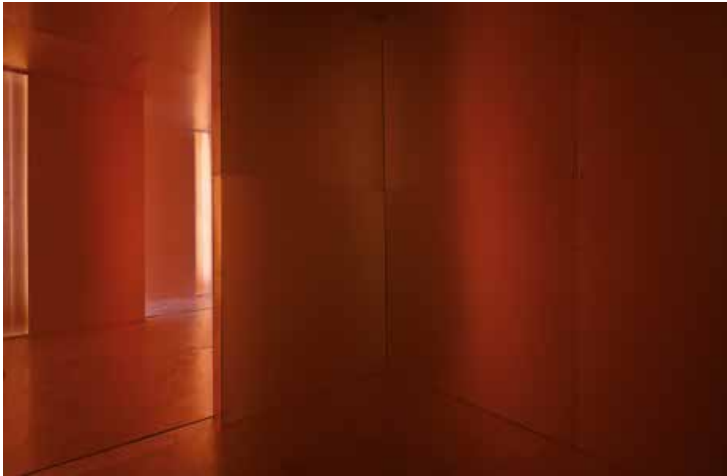
GJP Of course you need to know exactly what sort of sound the self-made devices make. There's quite a lot of pressure when you're up there on stage. You don't want a concert to be boring. It's got to stay fresh. I've been improvising for a long time now, and what's really important is knowing what you shouldn't do. All the performances we've done have taught me what to avoid. And reaching a point where it works in performances with other people can also be a struggle. How can you prepare for that? I do think ahead of time about roughly what should happen during a performance. Very often I start soldering again in the last few days before a show. It's not a good idea to keep on hammering away doing the few things you know work. The trick is to make sure the fascination for your own material stays fresh. Each time you play it should be like you're taking a new breath. When you turn a device on you should think, 'Wow, that's a really good sound. That's the one!'

AA Could you take me through a Synchronator show?

GJP If I'm playing with Bas then we connect our signals to each other. Bas gives me a signal, and that creates new connections. The duo performance is a ritual. You build up the tension together and that's expressed in the performance. As long as it's good, it's good, and then you can keep on going. And when it's gone, it's over. That's the way it is. There's not

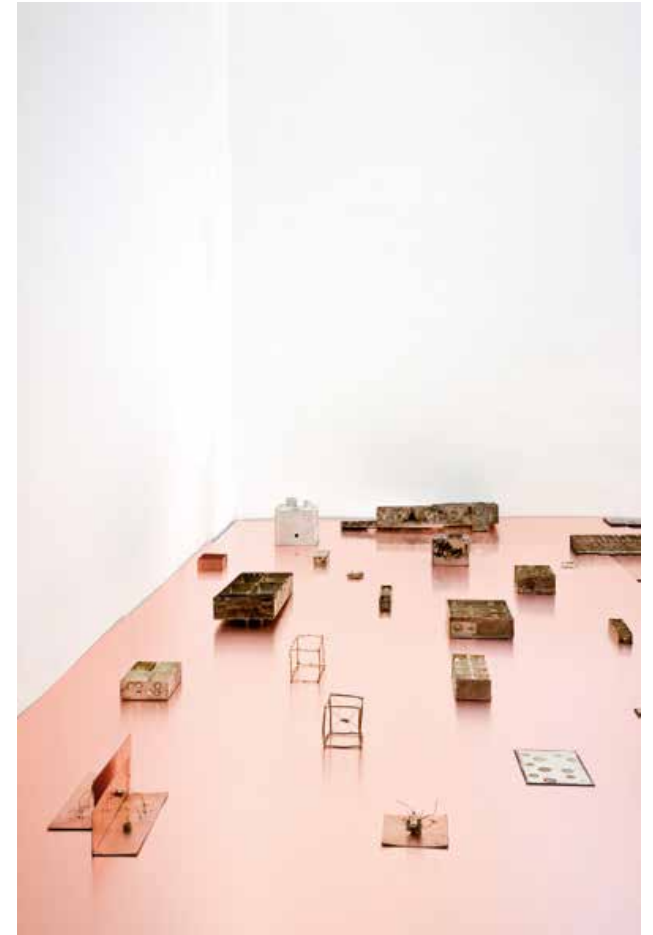
Gert-Jan Prins, *Shielded*, installation, 2010-, work in progress, *Hear it!*, Stedelijk Museum Amsterdam, 2011.





Gert-Jan Prins. *Cavity: the Capacitive version*, installation, Projectspace Onomatopee, Eindhoven, 2010.
top - the outside.
bottom - the inside.

Gert-Jan Prins. *Reduced Objects*, installation, Projectspace Onomatopee, Eindhoven, 2010.



much I can say about it. Improvising is all about experience. And it's a battle. I talked a lot about that with the Dutch drummer Han Bennink. He's a brilliant improviser and he's had loads of experience doing solo performances. The first twenty minutes are usually a big struggle. You often, but not always, have to really keep on pushing in an improvisation and then suddenly it crosses a point and starts working all by itself. When I'm playing alone or with Bas, the best is when things start happening by themselves - things just start coming out of the equipment, and you don't have to do anything. You don't even need to touch it. Something happens and it turns into a sort of self-propelling system. Maybe that's something I'm aiming for in a show: that moment when there's nothing left for me to do, when I could just walk away because it's running by itself and stays interesting. Sometimes I do actually move away when that happens. I take a step back and keep my hands off it for a while. But after a bit I start thinking, 'What would happen if I...?' And then I step back up and it's gone and you have to build up all over again.

AA Has the fact that the system becomes self-propelling got anything to do with the technology you use?

GJP If you work your way back to the circuits then it's logical that something of the kind might happen because there are unstable elements. The radio signal I use is by definition unstable. If you tune into a tipping point, or the 'side', of a signal, then you get all kinds of effects locked up in the complexity of radio technology. All kinds of drag effects are inherent to the tuning circuit because it's electromagnetic. It drags and you get the kind of viscosity that you can't fool around with. It's funny that magnetism has a sticky quality. It's tied up with Lenz's Law, which states that an electromagnetic field can work

against itself. The tuning circuit has an elastic quality: the signal has a range to it. This quality is very specific to radio technology. The signal wants to keep hold of itself. Anyone who's ever turned a radio-tuning knob knows that. But the moment you get just beyond the range that the signal itself wants to hold onto, the signal drops away like a stone. As far as I know, you don't get this with digital technology - or with sine or square waves produced by a generator.

AA Is there a difference between performing as part of a duo with Bas van Koolwijk, and playing with the larger 'orchestra' of Synchronator players?

GJP There are six of us when we play as the Synchronator Orchestra, and you really rely on your improvising experience. The premiere in Krems was typical in that everyone also took on a musical function. I was originally a percussionist and so was Robin Fox, and you could tell that immediately. We went straight into nice double drum background. It gives the context for continuing to think in that mode, even though we hadn't thought of it beforehand.

AA Where did the idea for the Synchronator Orchestra come from?

GJP We produced a batch of Synchronators so that other people could experiment with them, and because it was pretty costly to develop. Robin Fox was one of the first people to buy one. I seem to recall that Bas van Koolwijk was talking to him once and they suggested the orchestra idea. Then he tipped off Martijn van Boven from Sonic Acts and that's when the ball started rolling. It was good right from the outset: after just half an hour with the six of us rehearsing I thought, 'We can stop now - it's fine the way it is'. And we're going to continue with it.

AA An aspect of your installation work is that the speakers are hidden or replaced with alternative systems.

GJP I'm not a big fan of speakers. I don't find them attractive as objects. I'm working with salt crystals at the moment. They produce amazing sound. I've got a little box containing a salt crystal - potassium sodium tartrate. What you hear is a sort of radio through a tiny little single-watt amplifier. [Switches on the device.]

AA How do you generate the soundwave?

GJP I run an electric signal through the crystal, which creates an electromechanical effect that causes the salt's crystalline lattice to deform. And you can hear it happening, which I find absolutely fascinating. I've now put it into a stripped-down electronics box. I call it a 'reduced object'. The boxes have a perfect size and shape that directly relates to radio technology. The ones for 30 to 200 Mhz are the best format. The boxes for 1000 to 2000 MHz are really tiny, and I find that less appealing. The boxes they used for shortwave measurement devices up to 30MHz were real juggernauts coming from a totally different kind of aesthetic. The reduced objects have had their electronics, and their functionality removed. Then all that's left is a beautiful object. I clamped a salt crystal into one of them, so the box itself functions as a resonator.

AA How did you arrive at the idea of the reduced objects?

GJP In about 2008 I was very much taken up with how devices look on the inside. There's one specific machine, a Rhode & Schwarz tuner from the end of the 1950s- very high quality laboratory equipment - that captured my imagination. The most interesting reduced objects usually emerge from these pieces of high-quality lab equipment. It has to do

with functionality. The best equipment is in boxes with the most beautiful dimensions and proportions. The one I clamped the salt crystal into is the most linear box in existence. It was designed for the cleanest signal. You immediately see how beautiful it is. It's not that important to me that a signal's superclean: a clean signal can be very uninteresting if you connect it to audio...

AA In some sense this sort of box is the height of modernism, because it was made for the purest possible signal...

GJP They're definitely a high point in a certain period of dealing with technology. The technology was taken to its furthest extreme. It was the best possible measuring device of the period, the highest standard.

AA Do you find the salt crystal so appealing because you can get a sound out of it that can't be generated any other way?

GJP The sound of a crystal enters the space in a very different way than from a speaker. A speaker gives you the feeling the sound is coming from the heart and travels in one direction. But with a crystal, the whole object vibrates.

AA If you were going to develop this idea further would you make an installation set-up or do a concert?

GJP I'll just have to see how it develops. I'm working on several objects of this kind. I have to figure out if I can enlarge it and whether that has an added value. Maybe I'll stumble onto a completely new idea while working on it. I want to make a few of them and then see if I can start working with feedback - get the whole system to generate feedback. I'd be able to give a kind of mini concert with it - as long as it was in the right venue and the audience were really quiet.

AA: It generates a sound you could listen to for hours...

GJP Yes, it's good isn't it? It's also a big contrast with my performances. It's quiet and subtle. My shows are usually loud and subtle, but in a different way.

AA What strikes me about your concerts is that because the noise is so rich there isn't a moment when you long for melody and harmony or rhythmic sequences.

GJP I did consciously let go of that at a certain point. But when it comes to recording and editing for a CD I still come back to the question of how to shape it in a compositional way. I sometimes hear licks or melodies in the noise. I make musical choices. When I make a record I select recordings of the right tempo, with a good rhythm and an interesting distribution of energy over time.

AA Could you tell me something about the development of *Cavity*?

GJP The main way I get ideas is through leaving things out. My starting point for *Cavity* was a soundspace with no visible speakers. I'd made it for the *Deep Screen* exhibition in the Stedelijk Museum. My original idea was to make a space with hollow walls but it turned out I couldn't do it there. So instead it was a neutral room with speakers behind stretched fabric with the sound being played at mid-range. After that I carried on further along the same lines.

AA How did that lead onto your exhibition at Onomatopée in Eindhoven?

GJP At Onomatopée in 2010 I created a space with copper plates, *Cavity - the Capacitive Version*, and exhibited the *Reduced Objects*. At first I thought creating a space with copper would be far too expensive, but at the low

point of the credit crisis prices of raw materials tumbled and at the end of 2008 it was within the budget to create space out of copper-printed circuit board. Then at the Stedelijk I made *Cavity - the Shielded Version*. That was in 2011. That was a kind of zero point in my work. It was a tent in which electromagnetic radiation was all but completely cancelled out. There's only noise in that space. No other signal is possible. There is no connection anymore.

AA Where does the noise come from if you've shielded the space within the tent from all forms of electromagnetic radiation?

GJP When noise is created by devices, it's always the product of several components. There's thermal noise from the device itself, and there's some electrical noise, and then of course you've got the cosmic noise, which literally falls in from outside and passes right through the Earth.

AA So if you build a tent that shields you completely from electromagnetic radiation and you place a receiver in it, do you still hear anything?

GJP You'd still hear a tiny bit of cosmic noise, and I think you'd still hear a little bit of thermal noise. The total electromagnetic noise is reduced in the tent by 80 to 90dB. I think it'd be great to put a tent in a tent. Then it would really all be gone. If you went into the first tent with a receiver, then you'd still hear bits of signal, and in the second you wouldn't hear anything. I'll have to have a good think about that.

AA A tent that shields you from signals is a zero point conceptually. There's no radiation. But what does that mean? Should I interpret it as a statement about the electronic radiation that envelops us?

GJP It's more about territory. Those in power use this kind of tent so they can't be bugged. They use their computers in this sort of tent because with sensitive equipment you can eavesdrop on a computer from a hundred metres away, even without Wifi. What I'm most interested in is how it feels to be completely disengaged - to be without any connection, without your phone. Some people in the tent in the Stedelijk even experienced physical sensations: they felt like something had fallen off them.