A Hybrid Tonoscope - Project Outline
A collaboration between Lewis Sykes, The Sancho Plan and Anthony Rowe, squidsoup
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1. You and your work

1.1 What you want to do.

Through a convergence of art and science we're aiming to create a unique hybrid visualisation device - a part real, part virtual 'tonoscope' - that will allow us to produce dynamic and beautiful representations of sound based on the physics of waves and vibrations.

We want to craft an elegant and sonically responsive instrument - a minimalist analogue device integrated with a creative virtual system based on reality but that can be bent and twisted - to produce unreal and artistic visualisations. These 'virtualisations' would be superimposed on the real imagery to create an augmented device - where real and virtual elements complement each other, but the virtual behaves in ways that the real never could.

Ultimately we want to use the device to produce a series of exhibitable works: live performance, installation and film.

1.2 The idea behind the activity, and how you plan to do the activity.

The project is inspired through research into cymatics as pioneered by the Swiss scientist Dr. Hans Jenny, who published his first volume of *Cymatics - A Study of Wave Phenomena and Vibration* in 1967 and the second in 1972 - the year he died. These works are a written and photographic documentation of the effects of sound vibrations on fluids, powders, and liquid paste in which he concluded, “This is not an unregulated chaos; it is a dynamic but ordered pattern.”
Jenny used crystal oscillators and the tonoscope – an invention of his own design – to set plates and membranes vibrating. In the tonoscope, quartz sand is spread onto a drum membrane which is then made to vibrate by singing loudly through a cardboard pipe – the resulting vibrations cause the sand to produce complex symmetrical forms, low tones resulting in simple and clear patterns and higher tones forming more complex structures.

"The tonoscope was constructed to make the human voice visible without any electronic apparatus as an intermediate link. This yielded the amazing possibility of being able to see the physical image of the vowel, tone or song a human being produced directly. Not only could you hear a melody - you could see it."

In fact cymatics is an extension of earlier experiments in sound and vibration, most notably Chladni figures - discovered by the physicist Ernst Chladni, 1756-1829 - whose body of work laid the foundation for acoustics, the science of sound.

"When a flat plate of an elastic material is vibrated, the plate oscillates not only as a whole but also as parts. The boundaries between these vibrating parts, which are specific for every particular case, are called node lines and do not vibrate. The other parts are oscillating constantly. If sand is then put on this vibrating plate, the sand collects on the non-vibrating node lines. The oscillating parts or areas thus become empty. According to Jenny, the converse is true for liquids; that is to say, water lies on the vibrating parts and not on the node lines."

1.3 What you want to achieve and how it fits with your current work and its future development.

This project complements and extends our existing independent work in exploring synaesthetic approaches to visualising sound, real-time interaction with virtual systems and minimalist user interfaces. It will enable us to expand our knowledge, skills and expertise in creating deceptively simple, interactive, virtual visual and aural environments while exploring the complexities that lie behind them - wave simulation and modal patterns; the properties of virtual materials and particle system; real-time 3D interaction with fluids; artistic representations of sound; and intuitive user interfaces etc.

We have a clear plan of action:
• build an experimental analogue tonoscope - iteratively refine its design to extend
its responsiveness and define its aesthetic;

- research and extrapolate the maths and physics behind wave phenomena and vibration to model a virtual system based on physical laws;
- develop a virtual tonoscope that responds in a similar way to the analogue device but has the potential to have its output extended, bent and twisted;
- research existing artistic visualisations and the creative software employed to inform the development and aesthetic of the virtual output;
- work on ways to combine the two - augmenting the analogue with the virtual;
- develop this into exhibitable works: performance, installation and film.

We want to work collaboratively in an area of research and development of common interest to us both - that can then be used by The Sancho Plan, squidsoup and others in future work. This is a valid approach to us - both collectives being used to working with and sharing knowledge between cross-disciplinary practitioners on a project specific basis.

We have already undertaken a fair degree of research into cymatics and the mathematics and physics underlying these effects.

1.4 Why it is important to you or your organisation.

The Sancho Plan produce a range of progressive audiovisual compositions - live audiovisual performances, experimental musical animations and interactive audio toys. We draw inspiration - but take a contemporary slant on - the work of a succession of artists who have explored the links between the aural and the visual.

squidsoup perspective here

We are excited by the technological and creative challenges that this project will entail if it is to be realised: of extending our own and others knowledge and in adding to the rich history of work in this area; and in the creative opportunities the project will afford in making refined and beguiling audiovisual work of rare quality.

We anticipate that the exhibitable works produced through the project will have a natural constituency in the audiences of international media arts festivals such as Cybersonica, Sonar, Transmediale, Ars Electronica, ISEA, Ultrasound, Optronica, Futuresonic etc. and we're keen to extend our connections within this international media art community.

1.5 The names skills and experience of artists and other main people involved.

The project is a collaboration between Lewis Sykes of The Sancho Plan and Anthony Rowe of squidsoup - digital practitioners of long-standing and established reputation.

Lewis Sykes is a veteran bass player of the underground dub-dance scene of the 90s performing with acts such as Emperor Sly, Original Hi-Fi, Somatik, Pfink and Radical Dance Faction. He was also a partner in the respected underground dance label Zip Dog Records. An experienced interaction and graphic designer, musician and music technologist and experimental film enthusiast Lewis honed his interests in mixed media through an MA in Hypermedia Studies at the University of Westminster in 2000. Through his more recent creative collaborations – The iRiealists, Dublab All Stars and now The Sancho Plan – he continues to focus and refine his fusion of music, visualisation and technology. Lewis coordinates the independent digital arts agency Cybersalon, founding artists in residence at the Science Museum’s Dana Centre and instigated and produces Cybersonica, their international festival of music, sound, art
and technology now in its seventh year. He is a qualified Youth & Community Arts worker with many years experience of running art and music projects for young people and an experienced FE and HE lecturer in graphic design and new media.

Anthony Rowe biog here

1.6 **What you will do to achieve high-quality work through this activity – or how the activity will help in developing the quality of your work in the future.**

Creating exceptional work isn't just an ambition for us - it’s a raison d'être.

The Sancho Plan is a network of talented practitioners with a collective background in sound design and music production; interactive, graphic and 3D design; computer and mobile gaming; video, animation and experimental filmmaking; and programming and software art. The aim of the collective is to draw from this diverse talent to create unified and truly innovative contemporary audiovisual work.

squidsoup perspective here

1.7 **How you will involve other artists or skills.**

Both key collaborators have extensive networks of digital artists and creative software developers with whom we wok on a regular basis and we anticipate that the Hybrid Tonoscope project will draw extensively on input from this network.