Oratorio for a Million Souls. http://www.sonicobjects.com/index.php/projects/more/ oratorio\_for\_a\_million\_souls

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Introduction.

The *Oratorio for a Million Souls* was a major feature of the European Capital of Culture, Leeuwarden (Fryslan) 2018 Silence of the Bees.programme. This three year project consists of bee listening architectures constructed in three European botanical gardens, located in Buitenpost (Fryslan) and Emden and Oldenburg (Germany).



Fig.1 The completed Oratorio structure in the Botanische Tuin de Kruidhof, Buitenpost.

The structures were built by landscape-design volunteers from the Nordwin College in Leeuwarden - and the artist worked in close collaboration with Jon Drummond to create both the sensor hive and the associated realtime audio systems - as well as a series of new musical compositions for wind ensembles.



Fig.2 The woven willow frame is covered with Lame and cut bottles inserted for light.

## Description and Context.

The concept behind the Oratorio is to create a network of listening spaces that allow participants to become immersed in a world of insect sounds. As we enter into each domed listening space we are immersed in the sonic heartbeat of a Bee-Metropolis - and for a moment become a citizen meditating at the centre of a sonic hive - all working - all buzzing!

Physically each Oratorio is constructed in wattle and daub and is based upon the form of a traditional woven straw beehive (a *Skepp* in English). The hemispherical interior of the Oratorio provides a special acoustic architecture that resonates with the domed roofs of Cathedrals and Mosques spaces where sound becomes omni-directional and reverberant.



Fig.3 A roof of Fryslan thatch.

## So why bees?

As a colonial insect with highly defined social structures bees have for millenia provided us with a metaphor for human social organisation. The workers who make up the vast majority of the hive population, have stood for loyalty, obedience, courage and selflessness - and much of their behaviour would seem to support the anthropomorphic metaphors we attach to them.

The Bee Hive was a perfect role model for Nineteenth Century industrial capital, which like the Monarchy is based upon a rigid autocratic power pyramid. These metaphors have however evolved and changed with both the increase in knowledge of insect ecologies and as a reflection of changes in human social organisation. We now understand more about the intricate chemistry of Bee genetics as well as the complex decision making processes involved - for instance swarming which we now consider to be a type of collective democracy. Swarming to a new hive is not the work of an individual mind but a product of parallel processing, a natural neural network, that has evolved over a 100 million years - the hive as super-organism, the hive-mind.



Fig.4 Side view showing one of the bee-ports equipped with microphones and data sensors.

The *Oratorio for a Million Souls* works with BumbleBees - in Latin *Bombus Terrerestris* - and *Bombus* is derived from the Latin for Buzzing or Drumming so a direct link to the world of acoustics. For those unfamiliar with contemporary northern European farming techniques such bees are massproduced, colonies and human designed nests purposed for the task of pollination in industrial scale green-house horticulture.

*Oratorio for a Million Souls* is technologically simple and robust, each of the three Oratorio listening spaces contain two sensor-hives equipped with two types of microphones (very sensitive DPA miniature mikes located in the external Bee ports and contact piezo mikes embedded within the nests). The hives also contain sensors to measure temperature and humidity and this data is also used to create sound patterns. The real-time soundscape consists of the physical sound of bees landing and flying from the external *bee-ports* mixed with the busy interior of the nest. Augementing the physical bee sounds are two types of piano notes, low sustained notes that relate to temperature data, and short sequences of higher notes that are triggered



Fig.5 a sensor hive mounted inside the structure.



Fig.6 Data screen showing realtime hive conditions and bee flight.

when a bee enters or exits the nest. A sophisticated computer system mixes the real-time sound of bees with the data controlled piano sounds to create an ever changing four channel live mix.



Fig 7. One of the three Brass emsembles playing at the debut performance of B-Rhapsodie.

To complement the three architectural-acoustic structures we transformed live bee recordings and data samples to create a series of new musical composition. Live recordings made within the bee hives were analysed to give a palette of musical pitches. We then employed data from diurnal patterns of bee exit and entry from the hives to provide a sense of temporal structure to the compositions.

The composition made a debut in which three wind ensembles played simultaneously from each of the botanical gardens to be reintegrated as a musical whole by means of a three-way satellite Telecast broadcast at each location.



Fig.8 Ariel view of the debut performance Botanische Tuin de Kruidhof, Buitenpost.

## Conclusion.

*Oratorio for a Million Souls* is an attempt to integrate traditional/rural building methods into and art and science project that draws attention to the current debate on bio-diversity and species loss. In particular it refers to the concept of the "Green Desert" in which mono-cultural farming has eliminated habitat and therefore species diversity. The supply of industrial nest of Bumble Bees for this project is an ironic metaphor for the wicked problem of food security, agri-business and natural systems.

Keywords: Art and Science Bio-Acoustics Data-Sonification Sound-Art Public-Art Sonic-Architecture