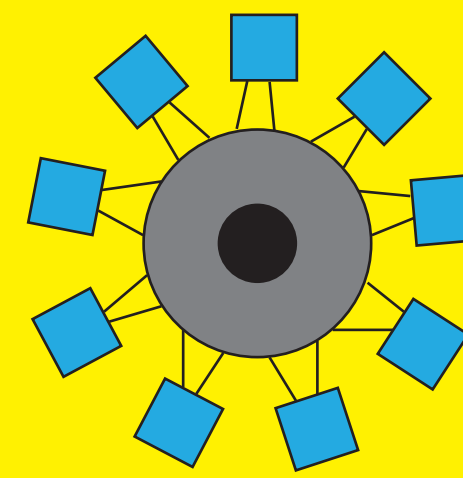


# Solarsonics: Patterns of Ecological

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# Praxis in Solar-Powered Sound Art

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## Introduction

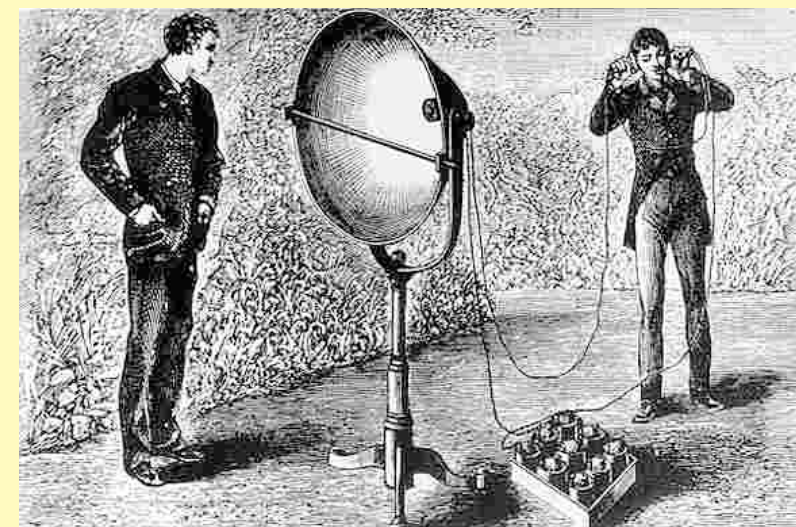
Harnessing the sun as an energy source is of great interest in this age of energy crises, and holds our imagination because of its quiet, seemingly magical properties. Photovoltaic technologies have grown quickly over the past 20 years, and more and more applications of solar power are finding use today. In the arts, solar power is often used as energy sources for public artworks, as a practical matter. These systems typically work in conjunction with batteries or other sources of energy in order to ensure a constant voltage and power level. However, an alternate approach is to design the work to use the sun's energy directly, and exclusively, with the sunlight itself as a functional parameter of the material. In this paper, we examine the use of photovoltaics in the direct production of sound as a function of its existence. These solarsonic works are designed to use the sun in the same way that wind-based artworks use the wind: they are activated directly, and are totally dependent on the light available in the moment. We survey solarsonic works by several artists, and discuss a series of works by the author, and conclude with a look at what the future may bring.

## Solarsonics

"I have heard articulate speech by sunlight! I have heard a ray of the sun laugh and cough and sing! ...I have been able to hear a shadow and I have even perceived by ear the passage of a cloud across the sun's disk."

— Alexander Graham Bell (Bruce 1990, 254)

The first focused scientifically based attempts at utilizing solar energy to produce sound can be traced back to Alexandre-Edmond Becquerel's original discovery of the photovoltaic effect in 1839 which, in turn, influenced Alexander Graham Bell's *photophone*, a concept Bell worked on through much of his life. Although the device was designed to transmit and receive radio frequencies riding on beams of light, it is clear that he was also interested in the direct, sonic response to sunlight. It is this orientation to the sun and its real-time properties that inspire the sound art works surveyed here. We propose an emerging praxis of *solarsonic* art that seeks to utilize light as a primary parameter of sound.



## Examples

The examples below demonstrate a similar orientation to the relationship between sound and light – in some cases specifically sunlight. With the onset of modern technologies, a concerted effort has been made in recent years to actualize the phenomenon of solar sound, or *solarsonics*, through exploring the relationships between technology and nature using photovoltaic installations and experimentation.

### Alvin Lucier - *Solar Sounder I* (1979)

A pioneer in many aspects of music composition and sound art, Alvin Lucier created a semi-permanent sound installation for the lobby of City Savings Bank in Middletown, CT, in 1973. For this, he created *Solar Sounder I*, an electronic sound installation utilizing solar-powered electronic sounds. His vision was to bring awareness to the listener of the cosmic grandeur of the movements of the Earth through the cosmos, the device changing in pitch and tone to the differences in day and even season (Lucier 1982).

### Joe Jones - *Solar Music Hot House* (1988)



Created for the 1988 Ars Electronica Festival in Linz, Austria, Fluxus artist Joe Jones created the sound installation *Solar Music Hot Box*. Inside the greenhouse structure, plants, along with several small percussion and string instruments are

carefully placed around the space. The instruments are "played" by motors and actuators, which are driven directly by small solar panels. In this way, the piece can be directly compared with wind chimes or Aeolian harps, in that they use the direct energy of the sun to drive mechanical processes.

### Craig Colorusso - *Sun Boxes* (2010)

Beginning in 2010, artist Craig Colorusso began exhibiting his piece *Sun Boxes*, a piece involving twelve wooden speaker boxes (which also have other electronics in them), with a solar panel mounted on top of each. These boxes play a recording of an ambient loop, based on a single guitar string recorded by Colorusso. The boxes are tuned to specific frequencies, and together create an undulating ambient texture. This piece has been exhibited in numerous venues (Roncallo 2012), and recently a short film has been created about this project (Belli 2012).



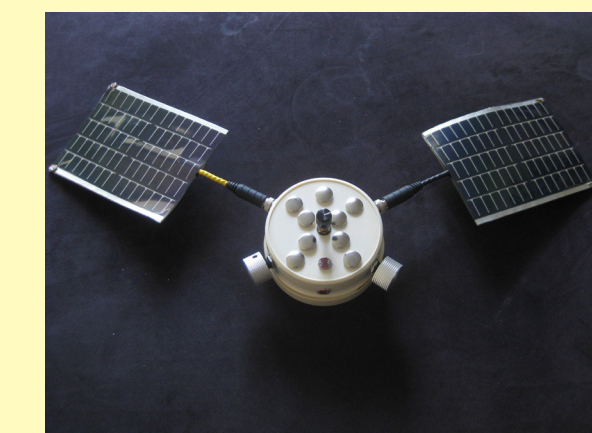
## Recent Work by Smallwood

I have worked with solarsonic issues since about 2008, when I became interested in the possibilities of laptop musicians performing outdoors with solar systems (Cook and Smallwood 2009).

This research led to an interest in custom hardware and portable, experimental handheld instruments, and simultaneously branched into sound installation concepts (Smallwood 2011). Below are two recent examples of work in areas of group synthesis and immersive sound installation.

### Scott Smallwood - *Radio Flyers* (2012 - present)

The Radio Flyers project began with the idea of creating an instrument that can produce relatively controllable sounds via an AVR RISC-based microprocessor. This series of instruments use the

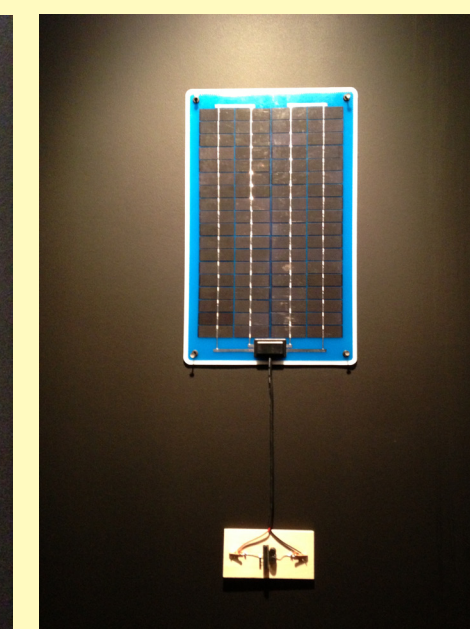
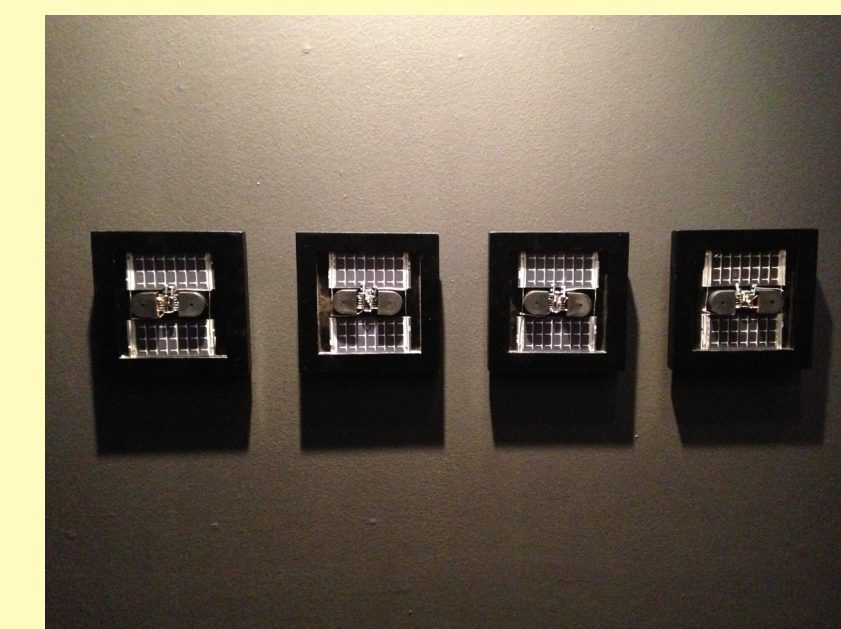


Atmel ATmega328 8-bit chip, which can be programmed to create between 2-3 separate audio voices with minimal means for wave-shaping, but still have quite an effective range of sound-making possibilities. These chips can be powered with very small

amounts of energy, and coupled with a simple LM386-based amplifier, can generate sounds with 1 milliwatt or less of power. These instruments also feature networking capabilities over a local xbee network, and the prototype above promises interesting results. The hope is to create several of these for group synthesis performance scenarios in outdoor locations.

### Scott Smallwood - *hideout* (2013)

*Hideout* is a recent sound installation, featured at the SeedSpace Gallery in Nashville, TN, USA during March and April of 2013. This piece consisted of several wall pieces hung as visual art, but which contained raw circuits and solar panels, generating small sounds using the gallery lighting. The concept was to create a kind of sonic "hideout", mimicking the forest soundscapes of an urban, Albertan river valley, but without referencing any specific place directly. The irony of these works is that they require light, but are designed for indoor environments.



## Conclusions

As electronics continue to miniaturize, solar continues to advance in efficiency, and artists continue to find ways to respond to both technological limitations and aesthetic juxtapositions, it is clear that the concept of solarsonic art will continue to flourish. This will happen both for conceptual reasons and practical ones, as more and more artists develop work for site-specific environments. Indeed, the Burning Man Festival attests to the innovations of outdoor, interactive media arts utilizing sustainable forms of energy, as do many other festivals including Ars Electronica in Linz, Austria, and the recently announced Destination Moon Festival of solar powered music and art, which will take place starting July 19th, 2013 in Chatham, New York, USA. Watch this space.

For more information about this research, please visit <http://solarsoundarts.com> for an expanded, media rich version of this poster.

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