

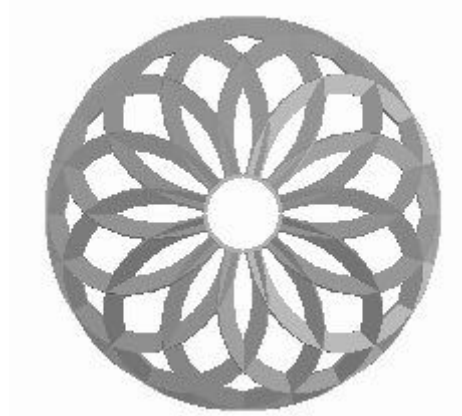
SWARM

2.1

They're baa-ack...



SWARM



**A KINETIC LARGE SCALE ARTWORK
FOR BURNING MAN 2008**

Primary Contact: Michael Prados

email: mprados@gmail.com phone: (650) 823-3724

630 Connecticut Street, San Francisco, CA 94107

project web site: www.orbswarm.com

wtf?



“A motion and a spirit, that impels
All thinking things,
all objects of all thought
And rolls through all things.”

Wordsworth

Orbs roll

Orbs flock

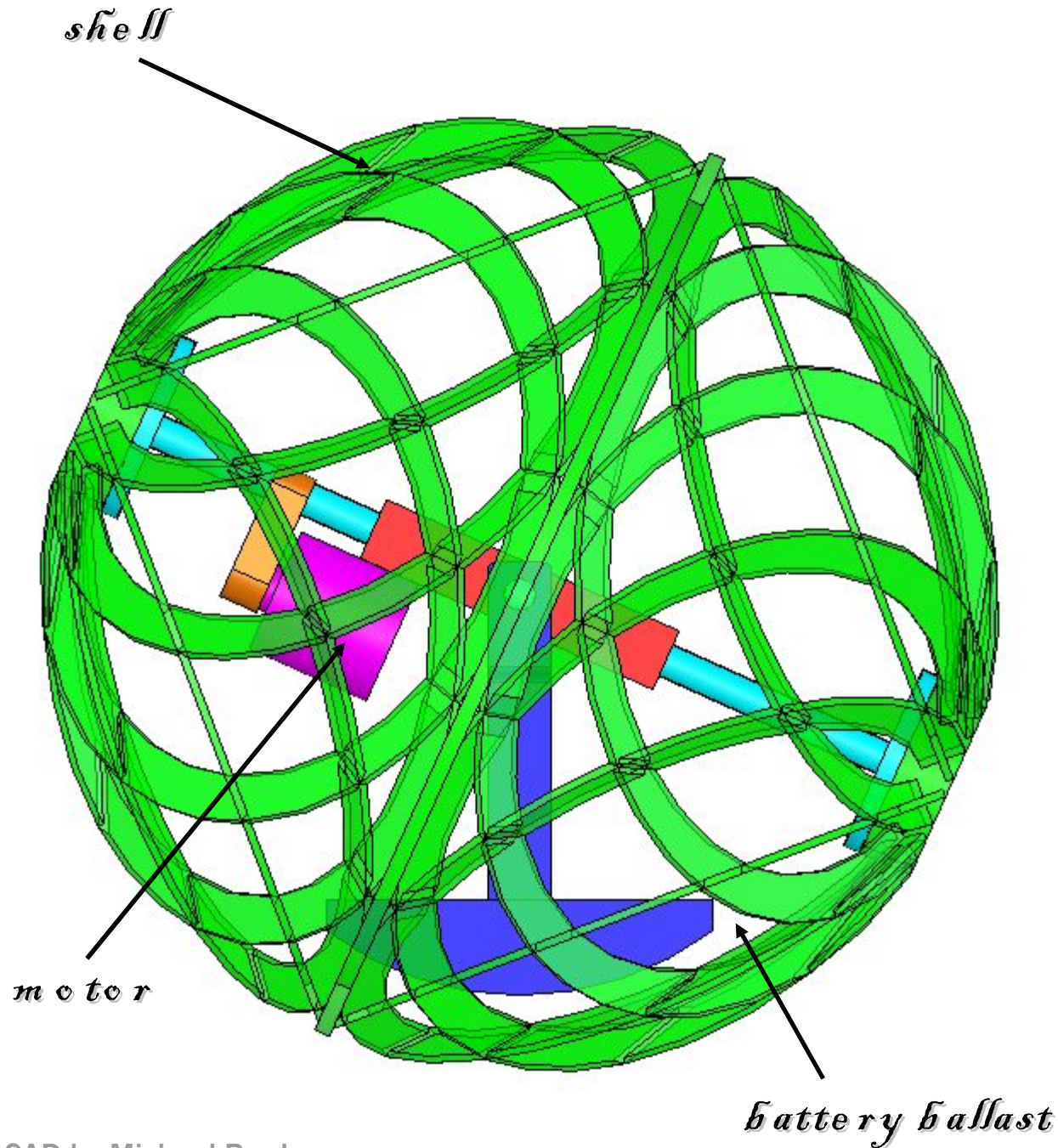
**Orbs play sound and
music**

**Orbs light colors in
response to the
environment**

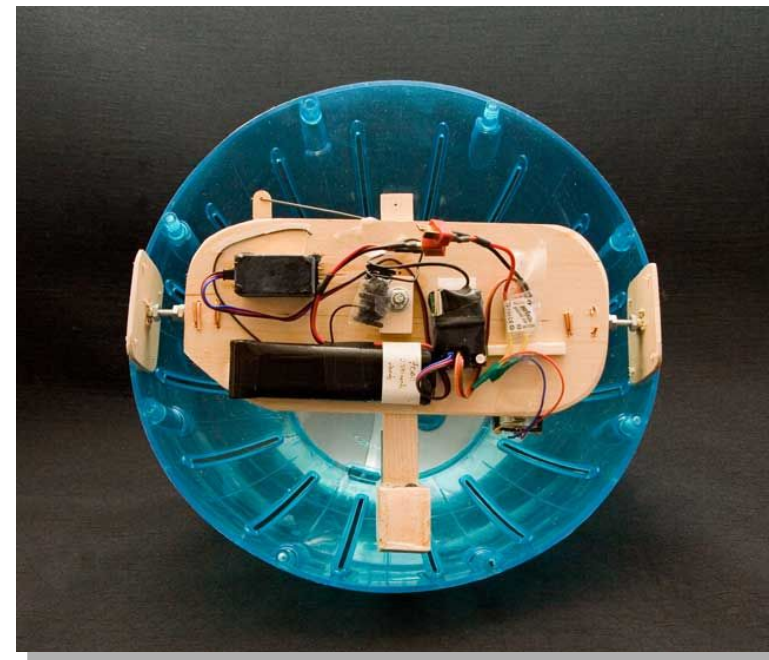
A SWARM of rolling robot ORBS

evolving complex dances of LIGHT and PATTERN.

how they work



CAD by Michael Prados



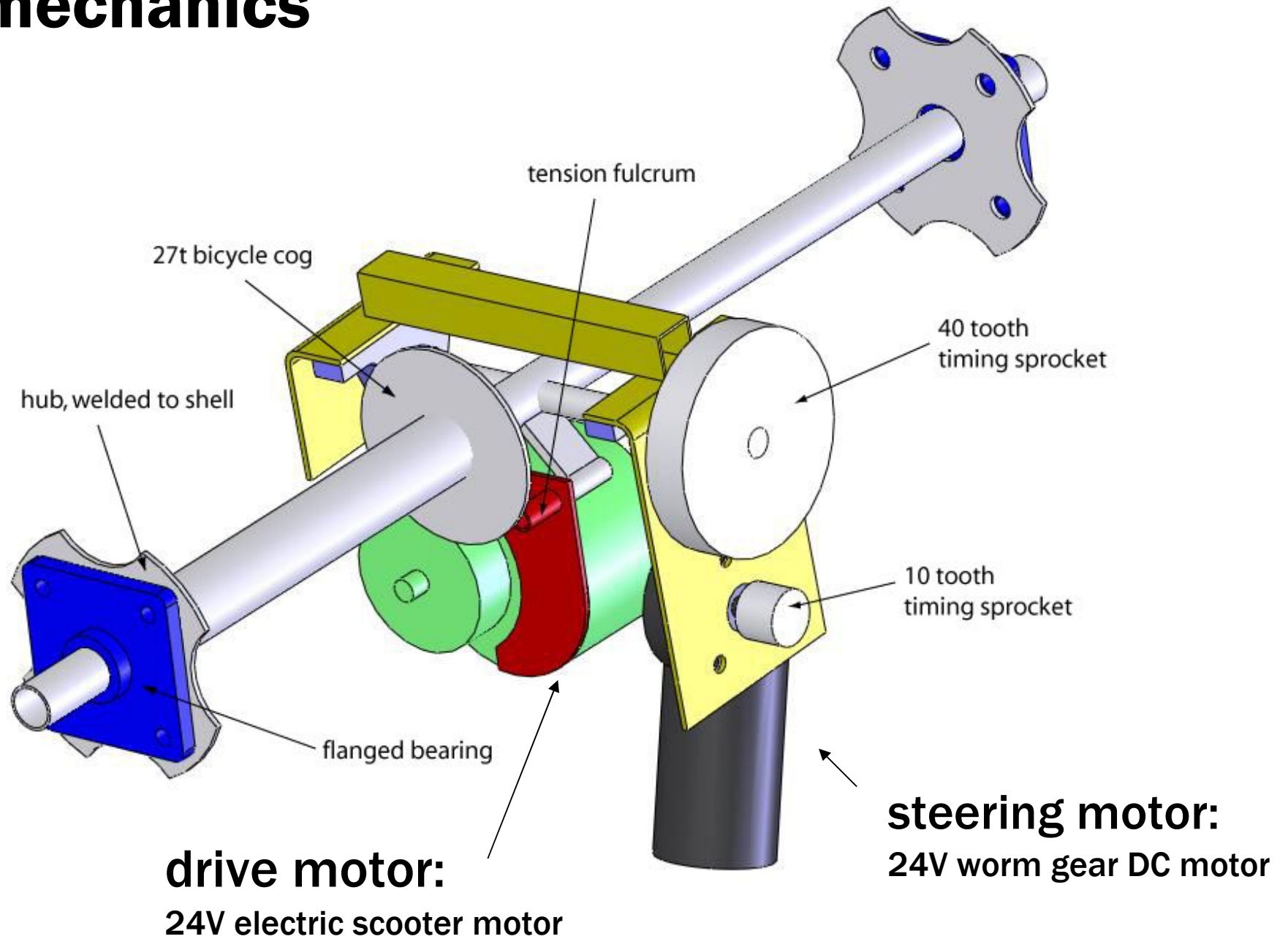
hamster ball prototype
by Pete Burnight

A heavy battery pack provides a reactive ballast.

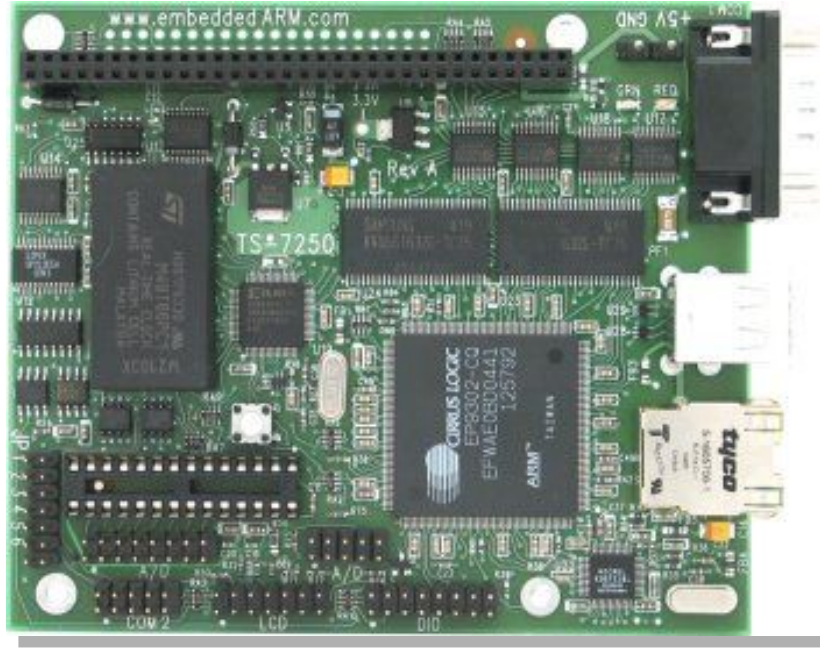
A drive motor spins the shell against the ballast, causing the orb to roll

A steering motor tilts the ballast, allowing the orb to steer

drive mechanics

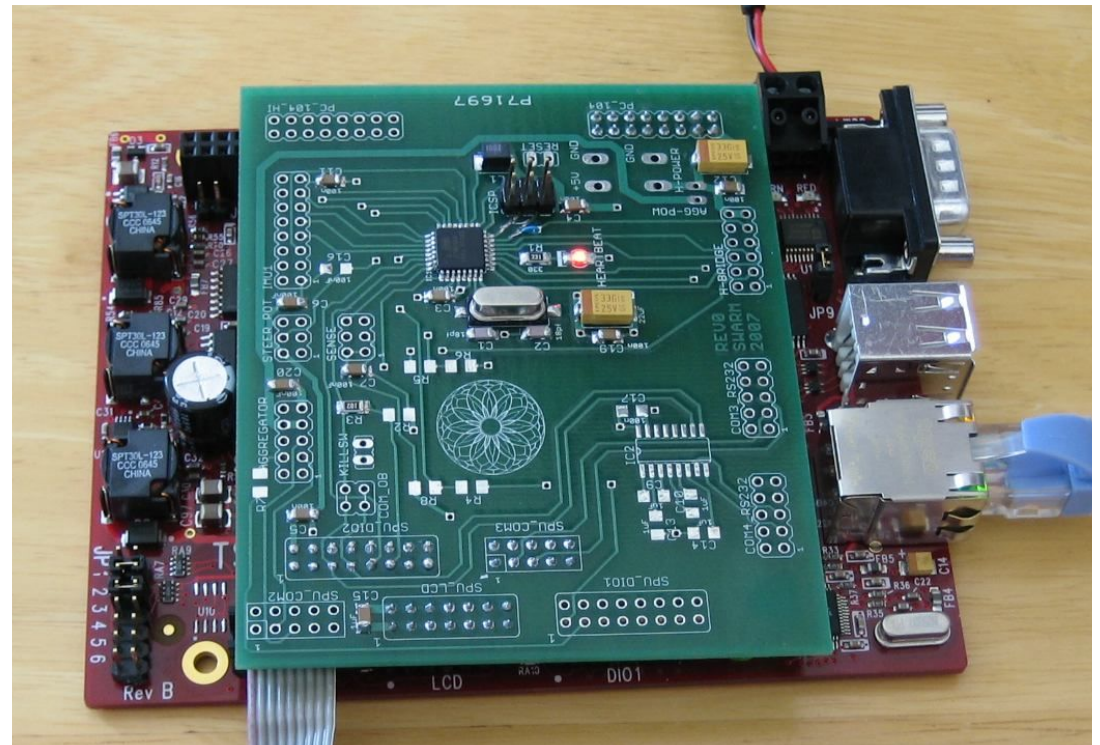


the brains of the operation



SPU – Swarm Processing Unit
200 MIPS Linux ARM processor
less than 1 watt power consumption
embeddedarm.com

**Custom AVR daughterboard
for motor control, plus custom
H-bridge motor drivers**



P.S. All our software is open source: www.orbswarm.com

sensors working overtime

Global Positioning System (GPS)
modules



Micro Electromechanical (MEMS)
accelerometers and yaw rate gyros
(sparkfun.com)

Zigbee radio for serial digital
communication
xbec.com



What's New in 2008:

- ◇ **More and better lighting**
(twice as many light pods, individually addressable)
- ◇ **Enhanced sound**
(new enclosure and algorithms, higher fidelity)
- ◇ **More powerful on-board computer**
(more capabilities, better navigation)
- ◇ **Enhanced algorithms**
(more responsive to location and proximity)
- ◇ **Enhanced controls**
(individual controls for untethered operation)
- ◇ **Enhanced reliability and rollability**
(more Orbs, more often, more places)

Why you should fund us again:



- ◇ *We are still working towards fully autonomous SWARM behaviour. This is an extremely challenging project. Support from Burning Man was critical to the initial project as well as our continuing progress.*
- ◇ *We are self-funding major hardware upgrades, and this year we request only reasonable transportation costs*
- ◇ *We will use our time on the playa to capture data and benchmark algorithms towards autonomy.*
- ◇ *Getting operational high technology to the playa is not easy. We were proud to deliver last year, and we will do so again.*
- ◇ *You understand our vision like few other organizations. Whether our application is successful or not, we thank you for that!*

vision: interactivity



The Magic Wand allows participants to control SWARM and direct formations like a sorcerer.

Budget:

Six Orbs based at Illumination Village

transportation (truck rental, loading, and fuel): **\$1500**

consumables (power, tools, shop rent, etc.): **\$500**

total: \$2000

Six Orbs with Mothership pedal-powered carrier

transportation: **\$2000**

consumables: **\$750**

Total: \$2750

Clean Up

Most elements of our installation are mobile. Playa impact is negligible beyond area demarcation and nighttime anti-collision lights. Nothing is burned. Clean-up is therefore straightforward:

Monday Sept 1st:

All Orbs are collected and packed for transport.

Mothership is broken down for loading.

Tuesday Sept 2nd:

Truck loaded. Any playa impact (stake holes, etc.) is remediated.

Installation area and surrounding area swept for MOOP.

Artery staff inspect area and check off Swarm project.

No trace will be left. We will Leave No Trace.

Our gang

SWARM is a collaborative project featuring members of the Flaming Lotus Girls, the Sunflower Robots Project, members of the robotics, kinetic art, and Linux/open source communities. We are particularly proud of our unhierarchical collaboration style, and we were pleased to introduce several new burners to the playa last year. All SWARM designs and code is open-source and freely available to help or inspire other artists. We hope to continue our tradition of bringing high technology to the playa, on time, on budget, and operational.



We have an experienced, diverse, and technically sophisticated crew featuring many veteran Burning Man artists and engineers. In past years, crew members have made major contributions to the following Burning Man artworks:

A Field of Sunflower Robots (2006)

The Flaming Lotus Girls' Serpent Mother (2006), Angel of the Apocalypse (2005), Seven Sisters (2004), Hand of God (2003)

The Mad Scientist's L3K (2006) and STS (2004)

Al Honig's Hope/Fear Gauge (2006)

SWARM Crew

Aerin Heinemeyer
Charlotte Sanford
Chris Gerbik
Corey McGuire
Dawn Ryan
'Dillo Okay
Erik Swedberg
Jonathan Foote
Jesse Zbikowski
Lee Sonko
Lisa Schile
Marc Hertlein
Mark Alexander
Marnia Johnston
Melissa Mayer
Michael Prados
Niladri Bora
Ray Sykes
Robert Harris
Rick Taylor
Rick Lellinger
Simran Gleason
Stefano Corazza
Tad Rollow

With special thanks to:

Aimee E	Michelle Palmer
Anne Geluardi	Naemi Frey
Baba Frey	Nate
Barry Cogbill	Olivia G. Sawi
Ben Thompson	Olivier Bonin
Caroline Miller	Olya Myhaylovska
Charlie Gadeken	Paul Rowan Walker
Dan Sandberg	Pete Burnight
David Fine	Peter Luka
Drago Anguelov	Phil Spitler
James Stauffer	Pouneh Mortazavi
Jessica Hobbs	Rebecca Anders
Jill Manthei	Rich Humphrey
John Humphrey	Sameer Al-Sakran
Josh Hunter	Stella Rubenstein
Lee Chubb	Steven Nelson
Lemuel	Tasha Berg
Liam McNamara	Tom Kennedy
Mark Farrier	Vanessa Montiel
Matthew Cline	

thank you

www.orbswarm.com

