MICROBIT 6

"Birds" is the project I present this month; it is built with a simple electronic creating a nice scenery effect. To build the entire project I have followed two separate workflows: the building of the birds’ cage and the animatronics of the birds themselves, including electronics with micro:bit.

The inside of the cage - not visible - includes the moving parts laser-cut (see the article on laser cutting in this same issue of the magazine).

The cage emulates a traditional chicken cage with a cardboard base obtained by a black painted recycled box; the base of the cage is also the container of the electronics and the moving engines. The support structure of the cage is built with 2×3 cm wooden splines joined on the top side by two M2 threaded bars to give robustness to the entire structure. Around the cage, I have fixed a chicken grid that gives good visibility to the interior with a touch of realism.

The electronic assembly (no soldering is required) is based on the BBC micro:bit board and the All-in-one motor and servo controller by Kitronik (kitronik.co.uk). As already mentioned in the previous issue of this column the board can manage up to eight servos and four DC motors. For this project, I have used all the servo controllers available.

The laser cut parts can be done manually without difficulty with a couple of cutters, a scissor, and plywood saw; this part of the job only requires less time using a home laser cutter instead.

The moving components are of two types; the birds, moved by five micro servos and the twitters, moved by continuous servos – very similar to a geared DC motors. The birds' motion is simple, through a 2 mm thick wire transmission. Using a software delay and a different starting position every one of the five birds moves in a quite different way.

The creation of the twitters has been inspired by Rob Ives, another genial maker from the U.K. that creates ingenious paper mechanisms. I was searching by a lot of time a way to reproduce that "choo choo" sound used in wall mount clocks very popular during the '60s and ‘70s decades. Finally, I met his site (https://www.robives.com/) showcasing just what I was searching, easy to build from a single sheet of paper. First I made one of his models and it worked, then I studied the way to hack the design (released under a free Creative Commons license) adapting it to my needs. I made a set of three different tweeters moved by the continuous servos with a rotating cam mechanism.

For more details on Rob Ives and his work, read about him from his own words in the box.

Designs, sketches, and the micro:bit software (javascript and makeblocks) are available on the dedicated GitHub repository (https://alicemirror.github.io/birds/)

The complete Birds cage is one of the interactive machines shown at the Art-a-Tronic exhibition in Gent, from April, 5 until May 31. If someone of the shed Mag readers is around in Europe, he is welcome.

# Rob Ives Interview

Hello Rob. I loved your projects and your site, I think I will use some of your inspiring paper projects and hack them for one of my projects. I am doing a cage with tweeting birds and sound is generated by an automated version of your twitterer design.

Rob: Sounds good.   
  
So, please can you tell me something about you? Is a passion or something related to your job the designs you make so proficiently? Please, explain how did you start with the project site (https://www.robives.com/)  
  
Rob: I've been making paper models for quite a while now. I registered the site www.flying-pig.co.uk in 1997 while I was still a teacher. I started by being invited to write a book by Tarquin publications that was called Paper Locksmith; unfortunately, it is no longer in print but you can sometimes find copies on Amazon (https://www.amazon.com/Paper-Locksmith-Collection-Working-Together/dp/1899618031/ref=sr\_1\_1?keywords=paper+locksmith&qid=1552499427&s=gateway&sr=8-1).

The publication was fairly successful and I wrote the book Paper Automata for the same editor.   
I had produced six models to them but they only used four so I thought I would have a go myself with the other two. From there I started selling printed kits to shops and online via the flying pig site.

In 2000 I left teaching and this is now my full-time job. Most of my work now is on [www.robives.com](http://www.robives.com) that is my official site.  
  
Sounds a very interesting adventure. And as you started by 1997, this means more than 20 years ago. That for the Internet lifetime looks a geological eve!  
I am curious to know what approach you follow when creating a design from the real world subject to its mechanics. I see there is a lot of sophisticated solutions in your models  
  
Rob: I often work from the start of an interesting mechanism, either one I have thought up myself or one I have seen. I then try to imagine how it could be used in automata.

Alternatively, I start with a movement and try to work out the mechanism that could make it work. For example, I am currently working on a model turtle that when you squeeze it the head pops out.  
In this model, I had an idea for the mech but it turned out so the original idea wasn't very good; I'm currently working on an improved mechanism for this model.  
It's always interesting to work on these sorts of projects because of problem-solving.  
I've also been branching out into the laser-cut card which is a very interesting technology

My other question was just about the use of some alternative similar materials, like cardboard or 3D printed stuff  
  
Rob: I've done some work with laser-cut wood providing the mechanisms for another artist.   
The use of laser-cut paper looks promising because I can use that with publishers and they can provide pre-cut kits.

Where do you live, Rob?  
  
Rob: I live in Cumbria, in the North of England in a small Village called Broughton Moor  
I might have got my tortoise problem solved by then!

Thank you for your time, Rob! It was nice to speak with you.