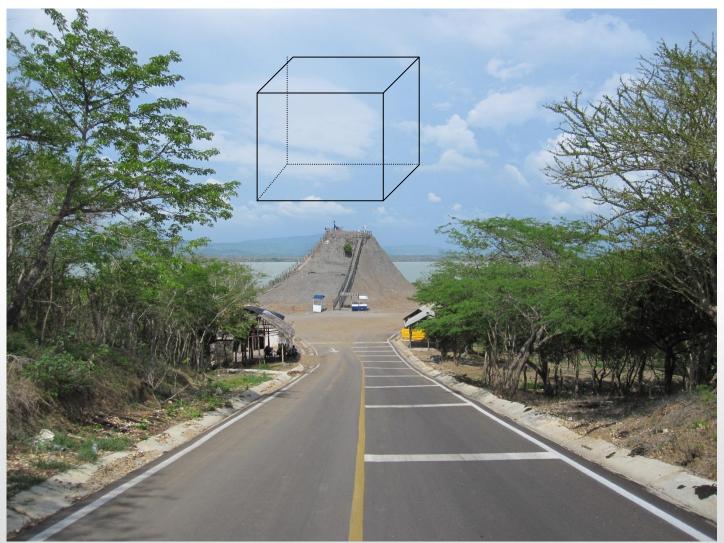


Using the cloud from above the clouds in low cost, high altitude science

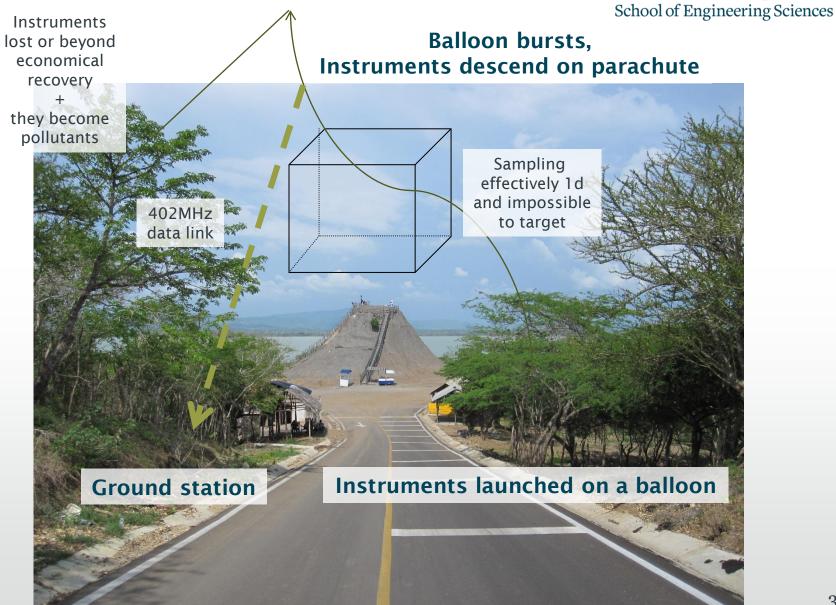
Steven Johnston

University of Southampton / PM .NET Gadgeteer, Microsoft Research

Atmospheric Science Southampton School of Engineering Sciences Through Robotic Aircraft (ASTRA)

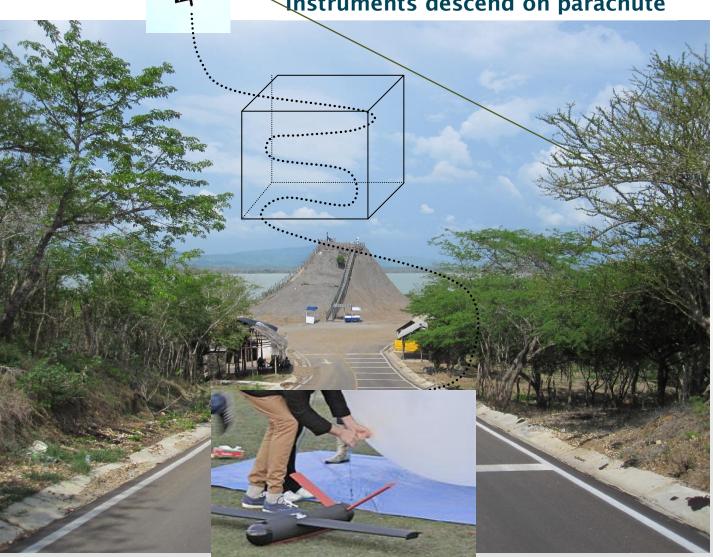


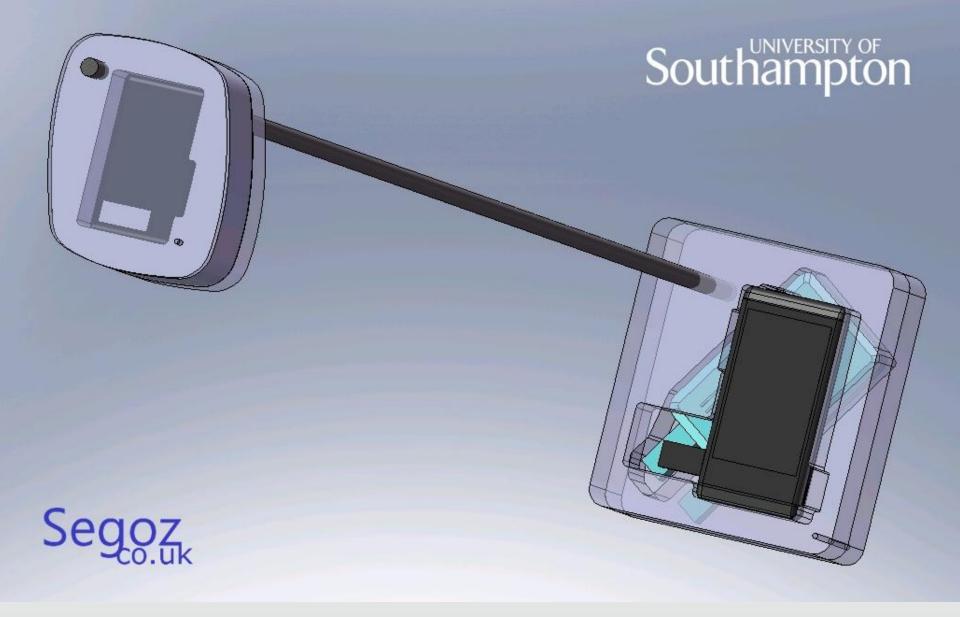






Balloon bursts, Instruments descend on parachute









Southampton



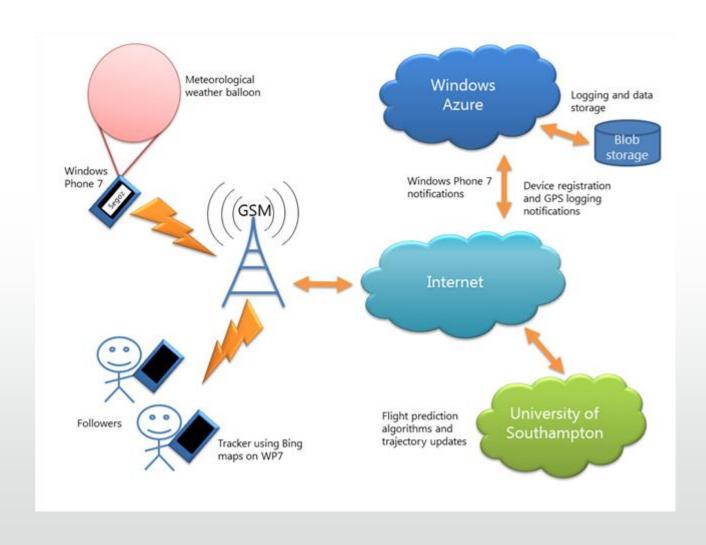
Segoz





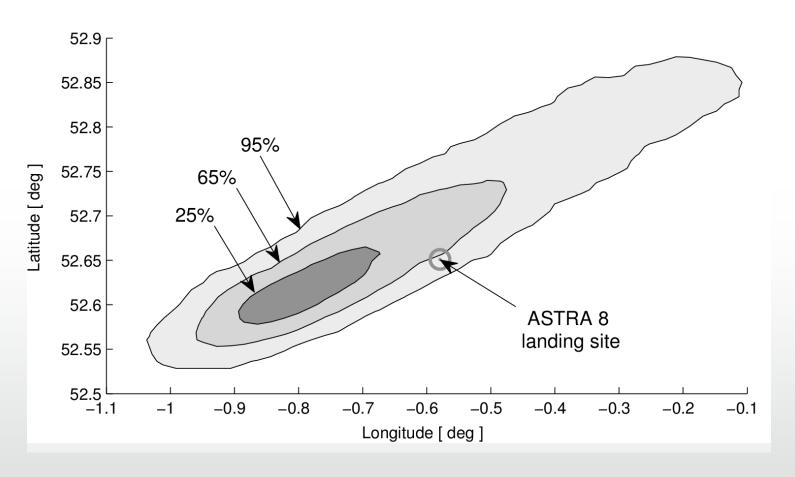


Cloud computing infrastructure



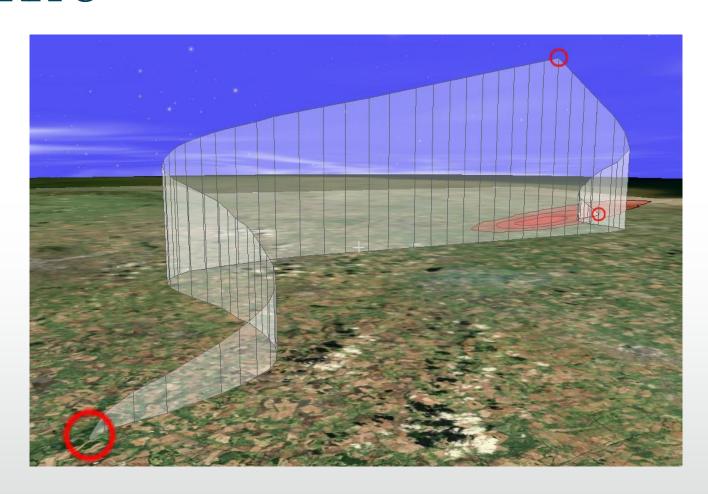


Landing 'ellipses'



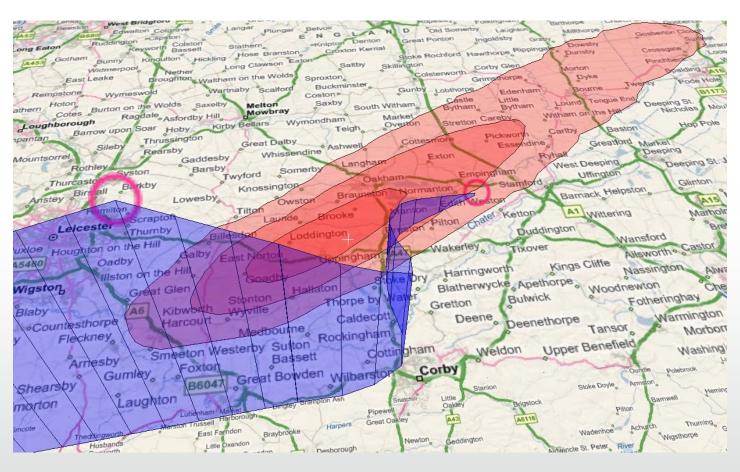


ASTRA 8





ASTRA 8: Apogee and Descent



Rapid prototyping techniques for customized vehicle development

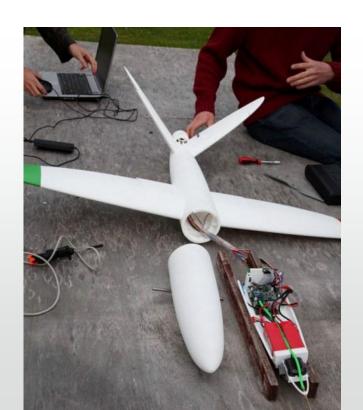






Rapid prototyping techniques for customized vehicle development

Laser-sintered airframes







Rapid prototyping techniques for customized vehicle development

• Rapid sensor integration - .net Gadgeteer



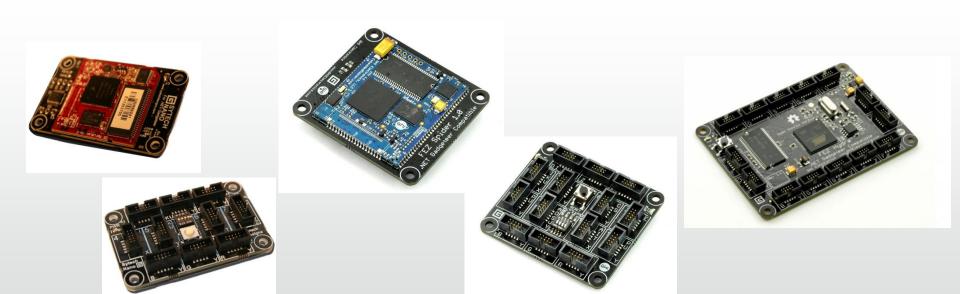
```
GadgeteerAppGettingStarted - Microsoft Visual Studio
File Edit View Refactor Project Build Debug Team Data Tools Architecture Test Analyze Window Help
 ■ 後 5 × 作 注注 = 2 □ □ □ □ □ □ □ □ □
    Program.Generated.cs Object Browser
    😘 GadgeteerAppGettingStarted.Program
                                                                   - ₽rogramStarted()
       namespace GadgeteerAppGettingStarted
            public partial class Program
                // Define and initialize GTM.Modules here, specifying their socket numbers.
                GTM.GHIElectronics.USBClientDP usbClientDP = new GTM.GHIElectronics.USBClientDP(1);
                GTM.GHIElectronics.Button button = new Button(4);
                GTM.GHIElectronics.MulticolorLED led = new MulticolorLED(10);
                void ProgramStarted()
                    // Initialize event handlers here.
                   button.ButtonPressed += new Button.ButtonEventHandler(button ButtonPressed);
                    button.ButtonPressed += new Button.ButtonEventHandler(button ButtonPressed);
                   // Do one-time tasks here
                   Debug.Print("Program Started");
                void button ButtonPressed(Button sender, Button.ButtonState state)
                   led.BlinkRepeatedly(GT.Color.Blue);
```



The .NET Gadgeteer Hardware

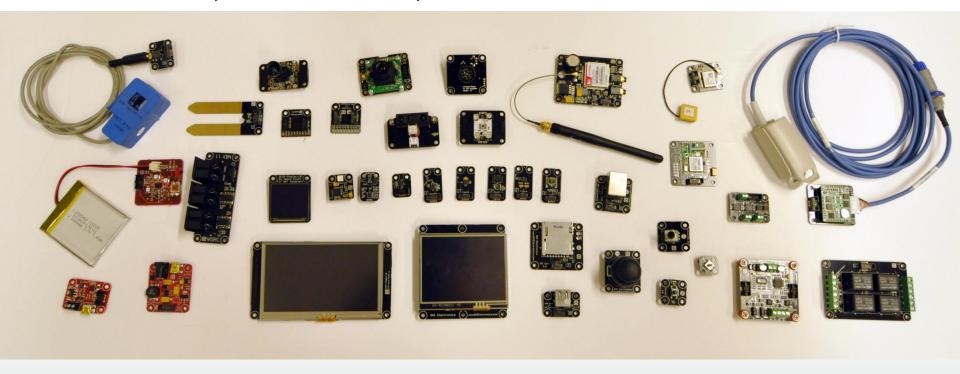
At the heart of every Gadgeteer project is a mainboard.

A mainboard is made up of a programmable processor, and a number of **sockets** that Gadgeteer **modules** can plug into.





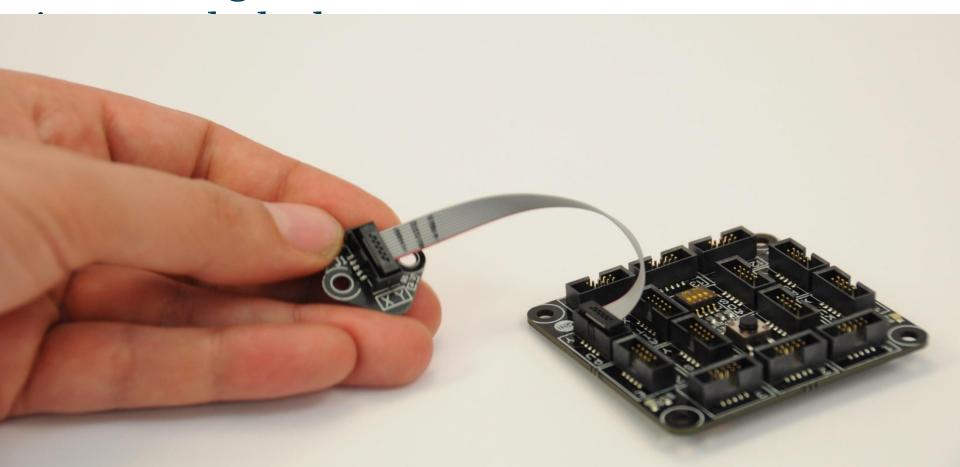
Modules, Modules



Sensors, Actuators, Networking, User Input, Displays, Power, Extensibility, ...



Connecting mainboards and modules:



: The hardware will not be damaged if the wrong socket is us

BALUGA / ASTRA Cube







Summary

- University of Southampton & Microsoft
 - ASTRA
 - Bizspark
 - NET Gadgeteer
- Phone + Cloud + Rapid prototyping (3d/Electronic) for Science



Acknowledgments











Segoz



See also... www.soton.ac.uk/~astra



