

Every year the Workington & District Amateur Radio Club invests some time in a project that will test our members and develop new skills and understanding. It is part of a life long learning programme that has been going on for several years.

This year we decided to collaborate with our local 3D printing facility, Cockermouth FabLab and build our own 3D printed satellite Az / Ele rotator using the Hackaday prize winning SatNOGS designs.

None of the team had 3D printed before, none of us had even worked a satellite and we had very little experience in microprocessors.



Contact details

The SatNOGS Project - <https://satnogs.org/>

The project website has all you'll need to know about building your own ground station. There is a community that shares knowledge and a

Workington & D ARC - <http://mx0wrc.org>

Feel free to get in touch and find out more

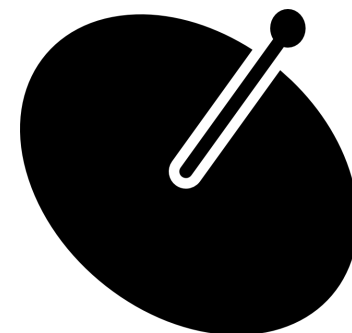
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MX0WRC

Workington and District Amateur Radio Club



SatNOGS

Homebrew Satellite Ground Station and Network

SatNOGS is an open source ground station and network, optimized for modularity, built from readily available and affordable tools and resources

<p>What SatNOGS is in a nutshell</p> <p>SatNOGS is a Satellite Networked Open Ground Station. It's a network of satellite ground stations focused on observing and receiving the signal of satellites, particularly low earth orbit (LEO) cubesats.</p> <p>How this project started</p> <p>SatNOGS started in mid-April 2014, during the NASA Space App Challenge hackathon in hackerspace.gr based in Athens, Greece.</p> <p>How much does it cost?</p> <p>We estimate that our third version (v3) of the design can cost from 300 USD to 500 USD. It is important to keep in mind that existing ground stations already used by ham operators can be used with the SatNOGS Network for a fraction of the cost.</p> <p>What SatNOGS can accomplish?</p> <p>Initially SatNOGS is focused on retrieving signals from LEO satellites in UHF and VHF bands.</p> <p>SatNOGS is able to retrieve status and telemetry signals, data from payloads (experiments) from scientific and research satellites (p.e. magnetospheric experiments), weather data etc.</p> <p>Does the International Space Station constitute a LEO satellite?</p> <p>Yes, it sure does.</p>	<p>What part of the SatNOGS stack is open hardware.</p> <p>We are focused on the mechanical rotator, and diplexer, low noise amplifier, antennas and PCBs.</p> <p>Where are all these available</p> <p>We designed SatNOGS to be built using readily available materials and access to basic tools and machinery using 3D printers and CNC as provided by average hackerspaces. We don't currently provide a kit solution, but we are actively exploring ways to provide a kit in the future.</p> <p>Weather conditions</p> <p>UHF and VHF signals are not affected by weather conditions. The rotator is weatherproof, and we are also designing a Radome to protect it from extreme weather.</p> <p>Does SatNOGS rotator need a broadband connection?</p> <p>If you are willing to connect your rotator to the SatNOGS network it is recommend to have access to an ADSL or a 3G data connection, for uploading the data back to the network.</p> <p>I have a commercial rotator, can I connect it with the SatNOGS network?</p> <p>Sure, do not hesitate to get in touch with us.</p> <p>How scheduling is done when there are two request for the same ground station?</p> <p>First come first served, but we explore functionality for special requests that allows for overriding this</p>	<p>What languages/software packets are you using?</p> <p>Arduino, Debian as the operating system, the SatNOGS client is mostly python, SatNOGS Network is in also in python utilising the Django framework</p> <p>What embedded machines are you using for SatNOGS Client</p> <p>Beaglebone Black is our reference design, Raspberry Pi2 and Odroid C1 and Odroid C3 is tested there are a lot of dev boards out there.</p> <p>Arduino? What board?</p> <p>We use Arduino Micro, but feel free to use your own board.</p> <p>How about power?</p> <p>We use PoE and voltage regulators, but we use batteries to drive operation for mobile deployments.</p> <p>How many ground stations are on the network?</p> <p>Currently there are three ground stations on the live environment, and six on the development environment. More than four other ground station are on the works.</p>
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