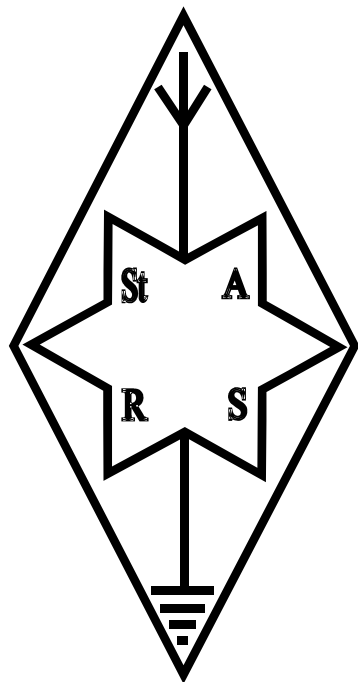


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The Newsletter for Members and Friends of
Stourbridge and District
Amateur Radio Society
incorporating
Old Swinford Hospital School Radio Club

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G4CVK

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ISSUE
04/2011



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<u>Visitors always welcome</u> 	The Society holds its full meetings on the 1st and 3rd Monday of each Month at Old Swinford Hospital School Heath Lane Stourbridge (8.00pm – 10.00pm) Additionally the shack is open during the same times on the intermediate Monday's
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*All correspondence/enquiries should be addressed to the
Hon. Secretary:*

John Clarke M1EJG
(01562) 700513

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STARS Web Site

WAP enabled ??

STARS

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21 Mill Lane

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Kidderminster

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www.g6oi.org.uk/wap/index.wml

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EDITORIAL

Dear Readers,

Welcome to the April edition of Starlite for 2011. Ten out of eleven of this year's intake of students passed the Foundation Licence exam, so congratulations to all involved on a well deserved success. Again, this month's article strays away from the subject of radio but touches on it to some extent, nevertheless I hope you find it interesting. I would like to thank John Scott for the AMSAT Bulletin which is of particular note concerning the 70 cms band! A special thanks also to Malcolm for his Roving Reporter item and pictures of the Wythall Rally and Constructors Contest in this month's thirteen page bumper edition.

As always I would be interested to receive contributions and feedback on any of the articles.

Regards

Adrian Bryan (G0NLA)



Foundation Licence Students pictured above, but not necessarily in order are Paul Anthony David Hateley, Harry Billingham, Paul Morgan, Brian Ansdell, Jane Leech, Josh Aldersley, Nicola Leech, Peter Wassall, Richard Hunter, Ava Williams and Mick Bedworth.



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SATELLITE NAVIGATION – A BRIEF TUTORIAL

Background

Sometimes a new invention comes along that is a source of fascination and the SatNav falls deservedly into this category; for most men at least. I hope the enclosed information improves your understanding of this ingenious device..

Scope

This article will deal mainly with non-military aspect of GPS – Global Positioning Systems.

GPS clearly has a military origin and is set-up and maintained by the US Department of Defence. The obvious military use for GPS is guiding cruise missiles and the like and the GPS satellites also detect and report back on major explosions and also, one suspects, the recent earthquake in Japan (2011).

At time of writing there are several navigation systems around such as the Russian Global Navigation Satellite System – GLONASS; the COMPASS system is run by China; the EU has GALILEO, all of which are in various states of deployment. This article will deal with Navistar which is the GPS system that Tom Tom and most current car Satnavs offerings rely on.

Horses for Courses

The military user enjoys greater accuracy than the typical non paying consumer user. Whereas the military user may want to send cruise missiles down the ventilation shaft of the Defence Department building in Central Baghdad, the motoring public has much less exacting requirements. In between the military and motoring public there is another group of user with slightly more demanding needs such as surveyors who require greater accuracy. This article deals with the least accurate version of GPS usage and not the more accurate differential form of satellite navigation.

What are its components?

There are currently 31 satellites orbiting the earth exactly twice per day. Note that a day in this context is the time required to complete a revolution of the earth and will differ from GMT which is subject to leap years and seconds etcetera. Of these satellites, only 24 are required and there is some redundancy and resilience built into the system as satellites are at various stages in their 10 year life cycles. The satellites orbit in six different planes with four satellites per plane. Each satellite transmits a signal of around 50 watts and uses two frequencies all in the UHF part of the radio spectrum specifically known as L1 and L2. Our signals of interest are in L1 at 1575.42 Mhz. At the heart of each satellite are three atomic clocks and all the satellites' atomic clocks are all synchronised to each other. Clock accuracy is roughly one second in 30,000 years. The satellites orbit at a height of around 21,000 km above the earth in a circular orbit - well almost, as the satellite is subject to the gravitational pull of the moon.

How does the Satnav Work?

There is an initialisation that takes place when the Satnav starts up. This starts by finding what



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satellites are visible. If the Satnav's aerial is situated inside the car then fewer satellites are detectable than if the Satnav utilises a purpose built aerial mounted on the roof of the vehicle. This is because the signals are attenuated through the vehicles metal roof. Initialisation time can be variable and this dependant on whether data from a previous start-up is still valid. If the start-up data is still valid or partly valid this will simplify the start-up process. This gets explained in more detail later under the topic "What gets transmitted from the satellite". A moving vehicle can also increase initialisation time as data transmission receive errors require that satellite signal acquisition process needs to be repeated.

As far as the civilian user is concerned, data is received from the satellite's transmitter and no data is sent back to the satellite. Your Satnav functions by receiving signals from at least four satellites and uses a system of measurement to calculate how long each satellite's signal took to arrive at your Satnav. For cost reasons the consumer Satnav has a much less accurate quartz controlled time signal than the satellite which causes some problems if times are to accurately measured.

At this point we need to think about the measurement accuracy of the journey time for the signal. The signal from the satellite travels at the speed of light which is approximately 300,000,000 metres per second. We therefore need to measure the journey time to an accuracy of at least 8 decimal places to be get an accuracy to the nearest 30 metres.

So how is our position calculated?

All the satellites' atomic clocks are synchronised with each other. Satellites orbits are regulated by ground stations and corrections are sent to ensure they revolve around the earth twice daily. To calculate its position a Satnav uses a technique called trilateration. The trilateration process needs to know the distance between the Satnav and the satellite for each satellite it has chosen to use. Note no angles are used as in triangulation. The timing is achieved because a satellite transmits a pseudo random signal which is known to the Satnav. The Satnav compares its pseudo random pattern with the satellites pseudo random pattern and measures by how much the one lags or leads the other. The travel time for each signal is converted to a distance from satellite to Satnav.

Taking stock we have the distance from the Satnavs to 3 different satellites. How do we then calculate our latitude and longitude and translate this to our position on a map? More data is required and this comes from each satellite's transmitted data. But before we go into more detail, let's try and visualise this in a two dimensional drawing.



Just suppose, ignoring satellite navigation for a while, that we know that we are 92 km from London and 174 km from Cardiff. If we then take a map of the UK and draw a circle with a centre at London and mark a 92 Km circle around London. Similarly on the same map mark a 174 km circle with its centre at Cardiff. In either place where the two circles intersect could be our location. Possibly Oxford or just to the north of Southampton. If we have a third known distance – in this case 103 km from Birmingham, we can

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mark out a third circle and this will give us a single location where all three circles intersect. Why? Because the first circle represents all places which are 92 Km from London and the second circle represents all places which are 174 km from Cardiff and the third circle represents all places which are 103 km from Birmingham. The Satnav performs a similar task to the above mathematically.

However this analogy is slightly misleading as the real picture is three dimensional as the Satnav and its three participating satellites are not in the same plane, or put another way, they would not all lie on an imaginary flat surface. In practice a fourth satellite is used and this enables the Satnav to fix its location in three dimensions, which are its latitude and longitude and height above sea level. In fact the real problem to be solved involves three intersecting spheres and not circles as above.

What data gets transmitted from the satellite?

For the purposes of our car Satnav the data sent from the Satellite comprises the following categories of information :-

- Clock and Time Data
- Ephemeris Data
- Almanac Data

The ephemeris data provides the Satnav with information that allows it to make an accurate measurement of where the satellite is located. The Almanac data tells the Satnav which satellites it should expect to be able to see.

Last but not least

At its simplest, a paper map takes a mass of detail such as the UK road network and reduces it to a sheet of paper or road atlas. Computers allow us to take similar detail, digitise it and compress it. The digital maps of the UK are provided by companies such as Tele Atlas who have fleets of vehicles much like the Google Earth which modify map databases alongside input from satellite photographs. The task of map display has been glossed over, but this along with the navigation algorithm are complex and ingenious pieces of software engineering. Recent advances in consumer Satnavs may incorporate a more realistic 3D display similar to what the driver can see from his front windscreen and guidance on which lane to use.



Footnote

This article has been more exacting to write than previous articles and I have had to consult a large number of sources. If you find any errors I would be pleased to hear from you. As usual, all errors and inaccuracies are mine.

Adrian Bryan (G0NLA)



RSGB Affiliated Society - The views expressed in STARLITE may not be those of the committee - Stourbridge and District
Amateur Radio Society

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March /April 2011 Starlite Roving Reporter 2011

It may seem strange but this is my first report of 2011. I have been collecting items to go into the report, but the problem is finding the time to sit at the computer and transcribe it. Well at last I have managed to find some time.

This year is a year of celebrations, it is 60 years since I became a member of both STARS and the Radio Society of Great Britain (RSGB) , 25yrs since Contactor Switchgear closed after having worked at the factory for 35 years starting on the 1st January 1951 and finishing on 15th August 1986. It was previously called Mining Supplies International. This being the fifth name change. Myself and other work colleagues who had been there longer than I having survived the take overs. At one stage in the early 1960s there were a number of Radio Amateurs working in the electronics department, which was formerly Radio Aids of Watford which was run by Earnest Gardnier G6GR and Bill Batholomew G8CK as Contactor Switchgear Electronics. Apart from industrial applications and using their knowledge of electronics into conventional switchgear, they produced a top band Transmitter (TX) and Receiver (RX). It was in two parts TX and RX and sold for £130 [which was a lot of money in those days]. The transceiver also included a mobile aerial. The total design won an award at RSGB show [indoor rally] in London in 1960s. Moving on. Contactor Switchgear moved the sheet metal department to Leominster in 1959 and I lived there with my parents. My father was the foreman over the Sheet Metal Department, so all our family moved along with another three key workers' families from Wolverhampton. I soon made friends with other radio amateurs in the area, but the best one which I never thought would happen, (which brings me on to the other celebration for 2011) came in contact at a dance I was running in Leominster with a Glenys Williams early in 1960 on 3rd April 1961. We were married at Leominster Priory Church so this year is Our 50th wedding anniversary and it is also 50yrs in October since we moved into our present home at 109 Longfellow Road. Our son Andrew was born in 1962 and so next year will be another milestone.

Also in 2011 it is 50 years since George Formby died and that was the 6th March 1961. On the 5th and 6th of March this year, a special concert spread over two days took place at the Imperial Hotel Blackpool. The concert featured all the numbers from the 22 films George Formby appeared in. Seventy four numbers were featured and my contribution was on the Sunday afternoon. The number from the film of the same name "Get Cracking"; also taking part was Derek Pearce G6WMU. So the George Formby Society has amateur radio connections. The former president of the GFS was also taking part. Little did anyone realise that three weeks later the society members would be at his funeral at St Marys church in Rotherham and that was the reason why I was unable to attend the first STARS committee meeting of the 2011 committee who were elected at the AGM on Monday 21st March. There were about 300 at the funeral of the former GFS president, which filled the church. He was 70 and this year would have been his 50th wedding anniversary. Continuing with the theme of anniversaries, this year it's the 50th anniversary since the George Formby Society was founded at The Imperial Hotel Blackpool on September 1961. Today, the society has 1000 members not just in the UK, but in other parts of the world. In his day, George Formby was Britain's highest paid entertainer. The celebrations for 2011 continue; it is 10 years since Glenys and myself became volunteers on The Severn Valley Railway, so what is more fitting for our anniversary than to have a meal at one of the railway venues.

Since the Buttermarket at Shrewsbury has been closed [last October] I have been going to other organ concerts some of which are in churches such as St Pauls in The Jewellery Quarter Birmingham. I attended my first Organ Concert at St. Pauls on 6th January. As I was leaving I recognised someone who I had seen at The Cinema Organ Concerts at Solihull & Fentham Hall .[ex



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Tower Cinema West Bromwich Compton] He is the treasurer of the COS (Cinema Organ Society) We exchanged e-mail addresses and I discovered that apart from his interest in Theatre Organs, he sings with a local choir and he is licensed G10OW. Amateur radio is a small world. He operates on 2m when he has time from his QTH in Acocks Green. In January Organist Chris Powell was playing at Kingswinford British Legion. Chris is a Short Wave Listener and he intends, when he has time, to try to get a full transmitting licence. I have known Chris and his wife for some years. Continuing on the theme of anniversaries, May will Gleny's 70th birthday. I often wonder how long I can keep going having so many interests ??? I must slow down some time now I am in my mid 70s.

I managed to attend my first Radio Rally for some time at Wythall. It has been two years since I was at a rally and I enjoyed it and thanks to Ian G4IKP for taking me there. I did come into contact with both STARS and Ex STARS members. I have included photos taken and at The AGM.

Well I have brought everything up to date and I will now start collecting material for the next report.

Best 73s for now

Your Roving Reporter - Malcolm Palmer G8BOP



Guess who performing “Get Cracking”



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WYTHALL RADIO RALLY PICTURES



Above Left ex club member John Tracey.



Above Right Giles (G0NXA), Adrian Sims and Stuart Mackinon chatting



Above Club Vice President Adrian Sims M3HBA in the Main Hall



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CONSRUCTIONS CONTEST

This a belated entry. Dr. Alan Parkes (left) receiving the Constructors Trophy from the Club Chairman James French (G7HEZ)



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AMSAT NEWS REPORT

Please note that the extract below is only part of the actual report. The full article can be found on at www.g6oi.org.uk and follow Stourbridge & District Menu → Satellite Info → AMSAT Weekly Bulletin. . Thanks for this contribution from John Scott.

Recently a bill, H.R. 607, the "Broadband for First Responders Act of 2011," was introduced by Rep. Peter King (R-NY). The bill addresses the creation and maintenance of a nationwide Public Safety broadband network. This bill is unique in that it provides for the reallocation of the 420-440 MHz block of frequencies away from its current primary and secondary users. The inclusion of most of the amateur 70-cm spectrum, and the entire spectrum allocated for the Amateur Satellite Service, constitutes a major threat to satellite operations. Almost all current and planned amateur satellites include the use of 70-cm band. If the use of 70-cm is lost, there is no reasonable replacement. The next available band, 23-cms, is restricted to uplinks, and is coming under increasing pressure from global navigation services. Likewise, 13-cms is rapidly becoming unusable due to terrestrial noise sources from consumer devices. The passage and implementation of this

bill will effectively end the ability to use relatively cheap, readily available amateur equipment for both amateur communications and university research programs. More details can be found at WWW.ARRL.ORG as well as a sample letter which may be edited for your use. There is information on using the ARRL's legislative liaison to speed the delivery due to existing security restrictions on direct mail. An AMSAT sample letter, stressing the interests of amateur satellite users, will be available at WWW.AMSAT.ORG next week.

[ANS thanks Alan, WA4SCA, for the above information]



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RSGB PRESS RELEASE !

Dear Colleague,

I am writing to let you know that today the RSGB has released the following announcement:

RSGB General Manager

Peter Kirby, RSGB General Manager, has left the Society's employment after the discovery of financial irregularities on his part.

For the time being, RSGB Director Don Beattie, G3BJ, will act as General Manager.

At this difficult time for the Society can I ask that everyone supports Don in his role. He may be contacted at Don.Beattie@rsgb.org.uk or 01234 832 701 / 07802 922 219

Dave Wilson



President

dwilson@btinternet.com

28 March 2011



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YOUR COMMITTEE

Hon. President	JAMES	G7HEZ	
Vice President	ADRIAN SIMMS	M3HBA	
Hon. Secretary	JOHN	M1EJG	(01562) 700513
Hon. Treasurer	JOHN	G8UAE	
Committee Members	ADRIAN BRYAN	G0NLA	
	MALCOLM	G8BOP	
	ANDREW	M6APJ	
	RICHARD	M1DBC	

CALENDAR of EVENTS

It should be noted that the Shack will be open every Monday evening unless shown otherwise in the Calendar

April	Mon 4th	Informal - On air or natter
	Mon 11th	Open Shack Night - On air or natter
	Mon 18th	Web Sites for beginners - John Scott G8UAE
	Mon 25th	No Meeting due to Bank Holiday
	Sat 30th	10:00 Meet at School - Roof work on aerials
May	Mon 2nd	No Meeting due to Bank Holiday
	Mon 9th	Open Shack Night - On air or natter & Committee Meeting
	Mon 16th	Main Meeting - Not yet arranged
	Mon 23rd	Open Shack Night - On air or natter
	Mon 30th	No Meeting due to Bank Holiday
June	Mon 6th	Informal - On air or natter
	Mon 13th	Open Shack Night - On air or natter
	Mon 20th	Club BBQ at the Sheepwalks
	Mon 27th	Open Shack Night - On air or natter
July	Mon 4rd	Informal - On air or natter
	Mon 11th	Open Shack Night - On air or natter
	Mon 18th	Main Meeting - Not yet arranged
	Mon 25th	Open Shack Night - On air or natter
August	Mon 1st	Informal - On air or natter
	Mon 8th	Open Shack Night - On air or natter
	Mon 15th	Informal - On air or natter (no main meeting)
	Mon 22th	Informal - On air or natter
	Mon 29th	No Meeting due to Bank Holiday
September	Mon 5th	Informal - On air or natter
November	Mon 21st	Club Surplus Sale

