BUILD YOUR OWN VEHICLE TRACKING SYSTEM

Ok so you have come outside to find your car/motorcycle stolen, its ok calling the Police but in realistic terms what can they do apart from log the event for insurance purposes. Ok the police will keep an eye out for the car but it isn't going to be a priority to them and the helicopter won't get involved unless the thief uses the car in the course of committing another offence , such as a robbery, or drives the car in such a manner that draws attention to it.

Commercial Tracking systems are very expensive, so why not take the matter into your hands and build your own. This easy design does not assume any previous electronics experience, as long as you can do basic soldering you can make your own.

Parts you will need:-
An old but working GSM Mobile phone with sim card (must be pay as you go).
An in car charger to match the phone
A plastic box bigger than the phone but as small as possible (allow room for the potting box too), preferably one with screws to secure the lid, available from Maplins or any good electronics retailer.
A small potting box, available from Maplins or any good electronics retailer.
A small amount of potting compound, available from Maplins or any good electronics retailer.
Industrial strength self adhesive velcro strip (enough to cover the rear of the phone)
Length of two core 5amp flex length depending on how far from the vehicle battery you are fitting the unit
Inline fuse holder, available from Maplins or your local auto parts dealer. (with 1 amp fuse)
Battery terminal connectors.

Building your Tracker

First of all cover the back of your mobile phone with one side of the velcro strips.

Carefully dismantle the in car charger to reveal the wires and components inside.
Note where the pip of the plug is soldered to .. this is the +ve feed
Note where the side springs of the plug are soldered to .. this is the –ve feed.

Remove the pip and solder the brown lead from your flex to this connection,
Remove the side spring and solder the blue lead from your flex to this connection.
Carefully tape over the solder joints you have made, and place together with any components that were in the charger into the potting box. You can throw the external casing of the charger away as its not needed.
Fill the potting box with the potting compound and allow to cure.
Once cured the components will be protected from moisture and damage.
Connect the charger to the phone.
Drill a small hole through the side of the main box to allow the two core flex to pass through.

Line the box with the opposing face of the velcro strip and insert the phone so that the faces mate and fasten. Using a spot of adhesive (or spare velcro) fix the potting box into the main box wherever there is room. Chances are there will be a metre of wire or so between the phone and the charger unit, coil this up and place inside box. Pass the two core cable out through the hole.
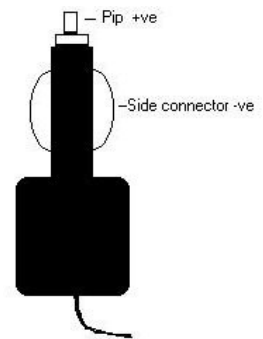
At the far end of the two core flex cut the Brown wire six inches or so shorter than the Blue one.
Solder the inline fuse connector to the shortened Brown wire then solder the Brown wire you cut off to the other end of the inline fuse connector.
At the ends of the Blue and Brown wires, Bare and solder to the battery connectors.
These should now be connected to the vehicle battery.
Check the phone is charging. (if the charging plug can be shaken loose you might want to consider taping it to the phone with adhesive tape)

Site the tracker unit out of site but where it will not be subject to excessive vibration, or where moisture may get into the unit. Also as far away as possible from things like alternators, indicator relays, electronic ignition units, and other sources of possible RF interference.

Points to note:

THE PHONE MUST BE LEFT SWITCHED ON

Do not use a metal box as this will reduce the signal and give false readings.

Remember that most pay as you go phones have unlimited lifetime expiry provided that they have credit on them, and that one chargeable call is made periodically, this is true of T-Mobile but please check with your mobile phone service provider for details.

Connecting to the battery directly will mean that the phone is constantly being charged, you might prefer to wire the live +ve terminal to your ignition key switch so that it charges only whilst driving. This is entirely up to you.

Should your vehicle be stolen, even if the thief pulls all the wires from the vehicle battery, the phone will still have its own battery to allow it to continue working.

Now you have successfully built your own tracking unit.

Now I hear you saying, well come on then how do I track my vehicle.

Log onto **www.192.com** and register with them, it costs £5 per month and this allows up to ten trackings per month. You can buy more credits if you need them, say if you want to keep monitoring the vehicle whilst its moving
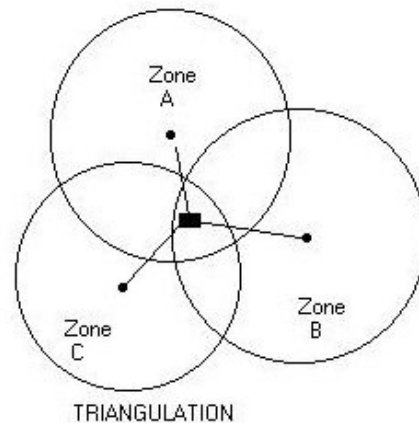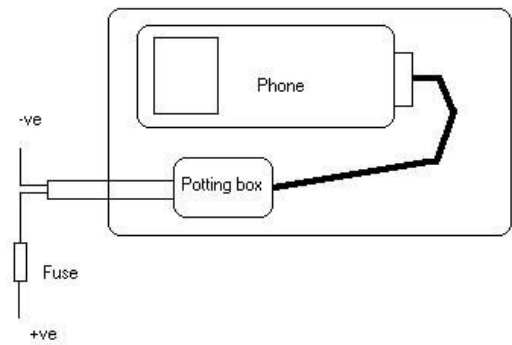
How does it work:

Whenever a mobile phone is switched on, at least three cell base units, sometimes more (commonly known as cell sites) will pick up on your phone signal, the signal is compared between each of the cell sites to determine signal strength. This is known as triangulation and accuracy increases the more cell sites are involved. As an example if three cell sites detect your phone then accuracy could be within 50 metres, if four cell sites detect your phone the accuracy could increase to within 10-20 metres. Obviously these figures are given for guidance only and offer no guarantee, the actual accuracy will depend on the network, cell site positions, and other factors.

When you have registered with **www.192.com** you simply type in the mobile phone number, and the system will report back to you where the phone (vehicle) is located.

The small black box in the above pic indicates your vehicle, you can see that it is nearer zoneA, and zone C , although Zone B has detected it , it is further away

Don't forget to check the lifetime expiry of credits with your mobile phone company, and make that periodic call to keep it active.

The other benefit of this system is that you will always have a fully charged mobile phone to hand in the event that you lose or break your normal one.

SO HOW DOES THIS SYSTEM COMPARE AGAINST GPS SYSTEMS

GPS systems are expensive mainly due to the user needing a GPS receiver in order to aquire the position, a transmitter to transmit the data, and a receiver at the business or home of the vehicle owner to receive the data. Altogether quite an expensive package.

All the GSM system requires are the parts previously described

ACCURACY Depending on the quality of the GPS receiver warm up acquire time can take up to 5 minutes or more if the vehicle is moving, on a good quality unit this may be as little as a few seconds. All GPS units acquire their position faster when stationary. Once aquired the GPS system will be more accurate that the GSM system however there will always be a time lag between the actual position of the vehicle and that shown on the display of the receiver, especially if the vehicle speed is not constant.

The GSM system will prove more accurate in large towns rather than in large rural areas. This is because each cell site can only handle 49 mobile calls simultaneously, and each cell site must overlap with at least another three cell sites. As there are fewer mobile phone users in large rural area's so fewer but Larger more powerful antennae's can be used with a range of up to 35 Kilometres, in Towns where there are thousands of users the antennae are still restricted to 49 simultaneous calls so therefore more antennae's are needed and because they must overlap are much closer together however because they are closer together they are far less powerful and may be spaced as little as 100 metres apart, this of course increases accuracy for the tracker.

PROBLEMS WITH GPS

GPS receivers must have clear line of sight with the satellites above otherwise they are blind, unfortunately most thieves know what a mobile GPS antennae looks like and all they have to do is cut the wire to blind the GPS.
If a GPS receiver enters a garage or other building, or even a small courtyard behind buildings the GPS will lose its signal and be blind, even entering dense woodland is enough to disrupt the GPS signal.
The GSM system doesn't suffer that problem otherwise they wouldn't work indoors.

HOW IS THE GSM DETECTED

Every few minutes the main relay station known as (HLR) Home location Relay interrogates each cell site for the phones operating within its area, The cell site sends out a transmission which each mobile picks up and replies with a response signal.. you may have heard this response signal from time to time over your TV or radio if your mobile phone is close by. If there is no response from your phone then your phone must be switched off. Ever wondered how when calling someone on their mobile, the system instantly advises you that the mobile is switched off.. well now you know !!
So if you fancy doing a vanishing act for a while.. don't forget to turn your mobile off.. and as soon as you turn it back on BINGO the system knows where you are again.

THE 192 SYSTEM & PINPOINTING
With the 192 system what you are actually doing is dialling up the mobile, however rather than it ringing the system gives you the location. Now lets say the vehicle being tracked has been, stolen and taken away and the location proves to be one of say 20 lock up garages in a street. Call the Police and wait their arrival, advise them of your tracking, and then ring your mobile number directly, the ringing tone should be heard and will pinpoint the exact garage unit. **DO REMEMBER TO TURN RING VOLUME UP AND CANCEL ALL DIVERTS**

Here are a list of links that may prove useful to you, some are service providers

http://www.lazyweb.org/archives/007941.html
http://www.news.com/2100-1033-846744.html
http://www.ulocate.com
http://www.wired.com/news/business/0,1367,21781,00.html
http://www.wired.com/news/business/0,1367,21781,00.html?tw=wn_story_related
http://www.spy.org.uk/cgi-bin/childlocate.pl
http://www.cellular-phone-antenna-booster.com/mobile_phone_tracking.htm
http://www.thepittsburghchannel.com/news/2373061/detail.html
http://www.lockpicks.co.uk
http://www.cell-phone-used.com/mobile_phone_tracking.htm
http://yro.slashdot.org/yro/03/12/21/0424202.shtml?tid=100&tid=137&tid=158&tid=99
http://www.hausernet.com
http://www.verilocation.com/
http://www.bmoinvestorline.com
http://www.legalaffairs.org/issues/July-August-2003/feature_koerner_julaug03.html
http://www.svbxlabs.com/pages/projects/cell/
http://www.tinhat.com/cell_phone/tracking_examples.html
http://www.crm-software-relationship.com
http://www.observer.co.uk/uk_news/story/0%2C6903%2C811027%2C00.html
http://www.traceamobile.com/
http://www.zdnet.com/anchordesk/stories/story/0,10738,2773979,00.html
http://www.mapamobile.com/
http://www.cell-phone-numbers.com/cell-phone-tracking.htm
http://news.cnet.com/news/0-1004-200-3624256.html
http://www.mobilelocators.com/
http://www.moremobile.co.uk/mobile-phone-tracking/
http://www.vehicletrackingsystems.co.uk/
http://www.3glocate.com/
http://www.betterbusinessphone.com/
http://www.childlocate.co.uk/
http://www.tncbilling.com/mobile_phone_tracking.html
http://www.way-mobile.com
http://www.greenbaynewschron.com/page.html?article=121552
http://news.com.com/2100-1033-846744.html
http://www.euro-teletech.com
http://www.freerepublic.com/forum/a37e0e9c85f80.htm
http://www.traceamobile.com/login.php
http://www.news.com/news/0-1004-200-3624256.html
http://www.netelectrics.biz/
http://johnandrews.typepad.com/risource/2003/12/blocking_cell_p.html
http://www.npr.org/features/feature.php?wfId=1124110
http://www.traceamobile.com/faq.php