Satellite tracking represents a new generation of electronic monitoring using satellite technology (and, in some cases, mobile phone technology) to monitor the location of offenders. It was piloted, from September 2004 to June 2006, in three areas of England: Greater Manchester, Hampshire, and the West Midlands. When the pilots were launched, in September 2004, it was suggested in the Government’s press release that satellite tracking would help to ‘deter offenders from breaking the law’ as well as providing public protection agencies with ‘extra intelligence’ about offenders’ movements which could ensure that there was a swift intervention if restrictions were ‘being flouted’. The then Home Secretary, Mr David Blunkett, described satellite tracking as ‘prison without bars’.

Aims of the evaluation
The aims of the evaluation of satellite tracking were to describe and examine critically the implementation of the pilot schemes in the three areas; to assess the technical performance of the equipment; to examine the views of offenders; to examine the views of key practitioners from the relevant criminal justice agencies; to assess (so far as was possible) the effect tracking might have on offenders; and to examine costs.

Programme of research
The main fieldwork phase of the study began in February 2005 and was largely concluded by the end of March 2006. All offenders who had a satellite tracking requirement in their licence/notice of supervision or community order from September 2004 to 31 December 2005 were included: 336 offenders in all. Semi-structured, tape-recorded interviews were carried out with 292 of these offenders (87% of those tracked), 75 staff employed by the various criminal justice agencies, 11 magistrates and District Judges, and 10 ‘field monitoring officers’ employed by the monitoring companies to fit and maintain the equipment. Other sources of data included files and electronic records held on tracked offenders by the probation service, the Youth Offending Teams (YOTs), the private monitoring companies, the Parole Board, and the Release and Recall Section of the Home Office. In order better to understand what it was like for an offender to be tracked, the author arranged to be tracked himself for a total of 75 days. The analysis that follows relates to ‘first

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1 The views expressed in this article are those of the author, not necessarily those of the Ministry of Justice (nor do they represent Government policy). This article draws on a Research Summary published by the UK Ministry of Justice in August 2007: see Satellite Tracking of Offenders in England and Wales, ISBN 978 1 84099 086 7, http://www.justice.gov.uk/docs/satellite-tracking-of-offenders.pdf
3 It had been also planned to interview 30 victims. However, because the three pilot areas in the end made little use of satellite tracking to protect ‘identified victims’, only four victims were interviewed.
4 The end date of 31 December 2005 refers to the commencement of a satellite tracking requirement not its conclusion and 81 of the 336 offenders continued to be satellite tracked after that date. Eleven of these offenders did not have their tracking equipment removed until the pilots ended in June 2006.
5 As this number was sufficiently representative of the larger group, missing data have been treated as missing at random.
periods’ on satellite tracking. Fifty of the 336 tracked offenders were released on other periods of satellite tracking during the evaluation period following their recall/revocation: 48 had two periods of tracking and 2 had three periods of tracking. Since offenders were not selected randomly for tracking but were chosen according to certain criteria, the findings of this study cannot be applied to offenders in general.

**Technology**

Three different private monitoring companies were involved in fitting the tracking equipment at the start of the pilots with just two at the end. In all cases, the equipment consisted of two separate devices: an ankle tag and a portable tracking unit that the offender had to keep with him at all times. It was the portable tracking unit which received the Global Positioning System (GPS) signals and was thus able to monitor the offender’s shifting location. Details were stored in the unit’s built-in memory and periodically uploaded (by landline or mobile phone technology, depending on the equipment used) to the monitoring company. The ankle tag (known as a ‘personal identification device’ or ‘PID’) was fitted to the offender’s leg. If the offender forgot to keep his tracking unit with him or if the tag were removed or damaged, the unit would transmit an alert to the monitoring company.

The technology could be used to provide location information in respect of an offender’s compliance with a defined exclusion zone only or to provide ‘general location information’ concerning the offender’s movements where no exclusion zone had been imposed or to do both things together. During the evaluation period, 24% of offenders were tracked on the basis that, other than in response to a specific request, location information would be provided only if the offender had been detected inside an electronically-monitored exclusion zone, 12% were tracked on the basis that the monitoring company would provide ‘general whereabouts’ information in addition to information about any incursions into an electronically-monitored exclusion zone, and 65% were tracked on the basis that the monitoring company would only provide ‘general whereabouts’ information.  

Two ‘modes’ of satellite tracking were used during the pilots:

‘**Passive**’ tracking: With ‘passive’ tracking, information was uploaded from the tracking unit to the monitoring company one or more times during the day. That information was then made available by the monitoring company to the offender manager on a daily basis at an agreed time. The consequence of adopting this approach was that information received by offender managers could be up to 24 hours old. ‘Passive’ tracking was the cheapest form of tracking to provide and could be used with or without an exclusion zone.

‘**Hybrid**’ tracking: ‘Hybrid’ tracking could be used only with an exclusion zone. So long as offenders complied with the requirements of the zone and did not tamper with their equipment or allow their tracking units to become separated from their ankle tags, ‘hybrid’ tracking worked in an identical manner to ‘passive’ tracking. In other words, data stored and processed by the tracking units were uploaded retrospectively and then communicated to offender managers by the monitoring company on a daily basis at an agreed time. The difference was that under ‘hybrid’ tracking the offender’s

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6 These percentages do not add up to 100 due to rounding.
tracking unit would be programmed to transmit a ‘real’ time alert as soon as any violation occurred rather than having to wait until the next scheduled upload, as was the case with ‘passive’ tracking. Information about those violations could then be passed immediately by the monitoring company to an offender manager or the police. Since violations might occur at any time, ‘hybrid’ tracking required an operator to be available in the monitoring company’s control centre at all times to respond to any alerts. Furthermore, if more than one offender were being ‘hybrid’ tracked, several operators might be needed just in case breaches occurred simultaneously. This made ‘hybrid’ tracking a more expensive option than ‘passive’ tracking.

Active tracking, whereby an offender’s general movements are followed in ‘real’ time, was not used at any stage during the pilots due to the high level of resources needed for its operation.

Three different makes of tracking equipment were used during the pilots:

*iSECUREtrac (model 2150)*: This equipment required a landline installed in the offender’s home for the tracking unit to upload its information. Uploading would occur every 24 hours when the offender placed the device in a ‘docking unit’ for recharging. Because the tracking unit was not connected to the cellular system, it was capable of ‘passive’ tracking only.

*ElmoTech STaR*: This tracking unit was linked to cellular networks and could therefore be used for ‘hybrid’ tracking as well as for ‘passive’ tracking. It was also able to provide ‘secondary location data’, based on cell sites, concerning an offender’s whereabouts. Thus, if the tracking unit lost GPS signals, some location information would still be available, although the ‘fix’ was not as precise as that possible with GPS. This equipment could be programmed to communicate with the offender by means of a bleep, a light or a text message on its integrated display panel. When in ‘passive’ mode, it uploaded its information to the control centre four times a day.

*Benefon*: Resembling a somewhat old-fashioned mobile phone the Benefon, like the STaR unit, was connected to the cellular network and so had the capacity for either ‘passive’ or ‘hybrid’ tracking, although it was not used to provide ‘hybrid’ tracking during the period of the research. The cellular link also meant that the offender could be contacted on the tracking unit by a text message or by a phone call. The messaging system was not installed during the pilot but offenders were occasionally phoned on the unit by the monitoring company to ask them about suspected ‘PID leave violations’ (i.e. where the tracking unit appeared to have been separated from the ankle tag by more than the permitted distance). When in ‘passive’ mode, the Benefon was programmed to upload its information to the monitoring company four times a day.

**Capabilities and limitations of the technology**

The Home Office, which had tested the satellite tracking equipment prior to the start of the pilot, understood both its capabilities and its limitations, as did the monitoring companies and at least some staff in the various criminal justice agencies in the three pilot areas. In ideal conditions, the technology was capable of pin-pointing the location of a tracking unit to an accuracy of between two and ten metres. However, conditions were not always ideal and it was recognised that tracking units would have
difficulty picking up signals when located within buildings and that, even when carried in the street, the presence of tall structures could impede or distort the signals they were able to receive. It was also recognised that offenders who were determined to commit crime could forcibly remove their ankle tags or leave their tracking units behind, although such action would be detected.

**Target offender groups**

Four offender groups were targeted for satellite tracking during the life of the pilots, although not all were tracked from the start: ‘prolific and priority offenders’ (PPOs); sex offenders; violent offenders; and domestic violence offenders. Satellite tracking was used not just on adult offenders but also on young offenders (those under the age of 18) who were subject to the Intensive Supervision and Surveillance Programme (ISSP), some of whom did not fall into the above categories.

**Costs of satellite tracking**

The average daily cost charged by monitoring companies to satellite track an offender ‘passively’ was about £42. Offenders (excluding those who had been ‘hybrid’ tracked) spent an average of 72 days on tracking, therefore the average cost charged by the monitoring companies to track an offender ‘passively’ was £3,024. These were the costs charged by the monitoring companies for providing the tracking service. They did not include the costs to the probation service or the Youth Offending Teams (YOTs) of supervising the offenders or interpreting the data received from the monitoring companies. The costs charged by the monitoring companies for providing tracking during the pilots are unlikely to be representative of the costs they would charge should there be a national roll-out of tracking. Costs would depend on the level of service required from the monitoring companies and there would be economies of scale which were not achievable in the context of a pilot.

**The use of ‘hybrid’ and ‘passive’ tracking**

96% of tracked offenders were ‘passively’ tracked and only 4% were ‘hybrid’ tracked. The limited use made of ‘hybrid’ tracking was in part due to local stakeholder concerns about the equipment and the systems of communication where an ‘identified victim’ was being protected by the exclusion zone.

**Who was satellite tracked and what risk did these offenders pose?**

94% of offenders were tracked following their release from prison and 6% were tracked as part of a non-custodial sentence. 80% were adults and 20% were young offenders: the two oldest were 70 and the five youngest were 13. 99% were male: just five female offenders were tracked. Tracking was targeted primarily at high risk offenders with prolific offending histories. Only 4% of adult tracked offenders were not considered ‘high’ risk by at least one of the following risk assessment tools: OGRS, OASys risk of reconviction, or OASy risk of harm.

35% of tracked offenders had been convicted of burglary, 17% of robbery, 13% of violent offences, 12% of sexual offences, 9% of motor vehicle offences, 7% of offences of theft, handling or fraud, and the remainder (8%) of possession of an offensive weapon or a firearm, criminal damage, breach of an antisocial behaviour order (ASBO) or bail, or perverting the course of justice.
How was the risk of tracked offenders’ re-offending managed?
Tracking was used as an ‘additional tool’ to other risk management techniques, such as the use of hostels (i.e. ‘approved premises’), exclusion zones, and curfews.

Approved accommodation: 40% of adult tracked offenders (and one of the 55 young offenders) who were released from custody were required to live in a hostel.

Exclusion zones: Exclusion zones were used to restrict the movement of tracked offenders and keep them out of areas where they were considered most likely to re-offend. The size of the zones ranged from a single shop to a single street to the whole of a relatively large town. Home Office Guidance stated that for tracked offenders released from custody it was ‘envisaged that supervising probation officers or ISSP/YOT will normally request an electronic monitoring condition in support of an exclusion zone condition or non-contact condition’. In the event, however, exclusion zones were used for only 35% of tracked offenders released from prison. There was also considerable variation in the use of exclusion zones between the different pilot areas: 93% of adult PPOs released from custody in one area had an exclusion condition, compared with 8% and 1 out of 16 in the other two areas.

Curfews: Curfews are regarded as another way of controlling risk. One of the perceived advantages is that they keep offenders indoors at times when many offenders are thought to be most likely to re-offend. Home Office guidance explained that it was ‘likely in most cases that there will also be a curfew period specified’. In fact, only 63% of tracked offenders released from custody had a curfew condition: 56% of adult offenders and all of the 55 young offenders.

Satellite tracking outcomes
In common with a number of other techniques of offender management, both breach action and completion of satellite tracking could be regarded as a success. If based on information obtained from satellite tracking, breach action showed that the technology was able to indicate inappropriate behaviour which might otherwise have gone undetected. Completion showed that an offender with a high probability of re-offending had managed to last the course (although not necessarily remained crime free). Analysis of recall/revocation data revealed that 58% of tracked offenders were either recalled to prison for breaching their licence/notice of supervision or had their community penalty revoked during the period that they had been ordered to be satellite tracked: 61% of adult offenders and 46% of young offenders.

Tracked offenders with the greatest probability of recall/revocation during the period that they had been ordered to be satellite tracked were adult PPOs who had been ordered to live in a hostel, 82% of whom were recalled/revoked.

Reasons for recall

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9 Of the 20 offenders who were satellite tracked as part of a court order, 15 were made subject to a curfew requirement: all 13 of the young offenders and two of the seven adult offenders.
19% of tracked offenders who were recalled/revoked during the period they had been ordered to be tracked were recalled/revoked solely on the basis of tracking evidence. A further 26% were recalled/revoked on evidence from tracking and from other sources. For 55% tracking evidence played no part in the recorded reasons for the recall/revocation. Where breach action was based on tracking evidence, it was founded on a violation of one of the various tracking requirements (37% of recall/revocation cases), an incursion into an exclusion zone which had been detected by tracking (5%), or a combination of the two (4%). Violations of the satellite tracking requirements included refusing to allow the equipment to be fitted, damaging or tampering with the equipment, removing the ‘personal identification device’ (PID) from the ankle, allowing the battery to shut down, allowing the tracking unit to become separated from the PID, or failing to ‘allow whereabouts to be monitored by GPS’.

Offenders unlawfully at large
Once an offender is recalled from a licence/notice of supervision an arrest warrant will be issued. However, it may take some time before that offender is then apprehended by the police and returned to custody. This provides an important reminder of the limitations of satellite tracking, and indeed of community supervision generally, whatever its level of intensity.10 Once unlawfully at large, if an offender does not continue to carry a tracking unit or keep it charged, it will not be possible to monitor the offender electronically and any protection that tracking can provide will be lost. The evaluation found that 32% (48/149) of adult tracked offenders who were breached and recalled via the Release and Recall Section of the Home Office during their period of tracking spent some time unlawfully at large. The periods spent unlawfully at large ranged from one to 233 days.

Further offences
Reconviction data from the Home Office Police National Computer as of 30 September 2006 were examined for all tracked offenders. Adopting this strategy allowed a minimum of three months for convictions relating to offenders who had finished their tracking in June 2006 to be recorded on the HOPNC, a minimum of four months for offenders who had finished their tracking in May 2006, a minimum of five months for offenders who had finished their tracking in April 2006, and so on. If a longer period had been available, more convictions would almost certainly have been detected. Analysis of these data showed that 26% of tracked offenders were either reconvicted for an offence committed during their period of tracking (17%) or while unlawfully at large following their recall/revocation (4%) or were considered by their offender managers (in giving reasons for taking breach action) to have committed an offence during their period of tracking (5%). 72% of those who were convicted of a further offence committed during their tracked period received a custodial sentence and 28% a non-custodial penalty.

Of the tracked offenders who received a custodial sentence for an offence committed during their tracked period (N = 42), one committed a very serious offence for which he received a sentence of life imprisonment. Of those who received a custodial sentence for an offence committed while unlawfully at large (N = 10), two committed

10 Those involved in running the pilots always understood this point and it was never expected that tracking offenders would be able to prevent them from going unlawfully at large.
very serious offences for which they received indeterminate sentences of imprisonment for the protection of the public.

**Court-ordered satellite tracking**

Only 20 offenders (6%) were tracked as part of a community penalty: 13 young offenders and seven adults. Nonetheless, the magistrates and District Judges who were interviewed for the research regarded satellite tracked exclusion orders as helpful sentencing options because they gave meaning to these exclusion orders by providing hard evidence of non-compliance, might deter offenders from committing further crimes, and might keep offenders out of their excluded areas.

**Satellite tracking as an aid to supervision**

Offender managers and police officers were asked what they thought was the primary purpose of using satellite tracking to monitor the movements of offenders released from custody. The views they expressed included providing a better way to monitor exclusion zones, which they said had been ‘hit and miss’ before; providing general information on offenders’ whereabouts which could be used to challenge and manage offenders’ movements and help them avoid dangerous situations; acting as a reminder to offenders that they were responsible for their actions; providing offenders with a ‘psychological reinforcement’ when they found themselves tempted to re-offend; deterring offenders from committing crime; protecting victims; and enabling the police to gather intelligence which could be used to link offenders to crimes or eliminate them from inquiries.

Most of the offender managers who were interviewed for this research were positive about the benefits tracking could provide. In their view, the technology offered a hitherto unavailable insight into the lives of the offenders for whom they were responsible, which in turn put them in a better position to take informed decisions about how to manage their risk. There was another group, however, that regarded tracking as more of a hindrance than a help. Their complaint was largely that supervision sessions tended to become dominated by offenders ‘complaining about the restrictive aspects of [their] licence coupled with technological problems caused by the equipment’ which they regarded as an impediment to carrying out more ‘offence-focused work’.

**Views on the satellite tracking equipment**

Field monitoring officers employed by the monitoring companies considered that the satellite tracking equipment had performed well but probation officers, police officers and YOT workers were generally less enthusiastic. Of the offenders who were interviewed, 51% said that their tracking equipment had broken down at some point, although many admitted that these problems had arisen only after they had dropped or damaged their unit or allowed it to become immersed in water.

**What role did satellite tracking play in the prevention and detection of crime?**

Interviews with offenders provided some grounds for thinking that tracking can assist in checking (although not eliminating) re-offending. When asked directly whether being satellite tracked had helped them ‘to stay out of trouble’, 46% of offenders said ‘Yes’. One commented that it was ‘like having a probation officer on your leg’. Another said ‘It helped me stay out of trouble because it was always at the back of my mind that they knew where I was and I thought if I do this I will go back to jail.’
In all three areas, there were cases where tracking provided evidence which assisted the police in the detection, investigation and prosecution of crime: it helped secure convictions where convictions would otherwise have been difficult to obtain and allowed the police to eliminate tracked offenders from inquiries where they would otherwise have been suspects.

**Conclusion**

The objectives of the pilots were ‘to gain practical experience of tracking technology’; ‘to learn how to implement and target tracking effectively’; and ‘to introduce a new sentence—a stand-alone exclusion order’. The first two of these goals were substantially achieved. Between September 2004 and December 2005, 336 offenders were satellite tracked and much was learnt about how the tracking equipment works and how it can best be used by criminal justice agencies to assist in the supervision and monitoring of high risk offenders. Knowledge about how to implement and target tracking effectively has also increased. However, issues surrounding the use of ‘hybrid’ tracking were left unresolved. There may be a role for this form of tracking in providing an added layer of protection for victims assessed as particularly at risk, but the limited use to which it was put during the pilots meant that no firm conclusion could be reached. On the other hand, if the main purpose of tracking is to provide information on offenders’ whereabouts in order to challenge them about their movements and help them avoid dangerous situations, or to provide robust evidence of violations of exclusion zones, this can be achieved through ‘passive’ tracking and may not even require the daily flow of information from the monitoring company to offender managers that was made available in some areas during the pilots.

The introduction of a new ‘stand-alone exclusion order’ monitored by satellite tracking was less successful. Only 20 orders were made, although the magistrates and District Judges interviewed for this study (N = 11) offered support, at least in the lower courts, for the idea that these orders should be made more generally available. There may also be scope for introducing a new requirement to monitor an offender’s general whereabouts. This could be either used separately or in conjunction with an exclusion requirement and might lead to some offenders being diverted from custody.

There is evidence from this study to suggest that tracking may offer further protection for the public from those released from custody and known to be high risk. This is reflected in the evidence relating to the percentage of offenders recalled/revoked on the basis of tracking evidence (either solely or with evidence from other sources): 45% in total. It is also reflected in the fact that evidence from tracking helped to secure convictions in circumstances where convictions would otherwise have been difficult to obtain and that 46% of tracked offenders who were interviewed, when asked whether being tracked had helped them ‘stay out of trouble’, replied ‘Yes’.

The technical performance of satellite tracking equipment will continue to improve. Tracking units will get smaller and better at picking up signals from satellites, battery life will be enhanced, and reliable one-piece units will become available. The major outstanding issue from the pilots, however, is whether the benefits that can be

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11 The magistrates interviewed represent one pilot area only due to the fact that all but three of the 20 offenders in receipt of court-ordered satellite tracking were supervised in this area.
obtained from tracking can be delivered at a price which warrants it being rolled-out nationally. Key here is to produce a much more automated system, capable of providing offender managers and police officers with location information on offenders when they need it but without requiring too much manual intervention by monitoring company staff. It needs to be recognized, however, that reducing the burdens carried by the monitoring companies could add to the burdens borne by staff in the relevant criminal justice agencies.