

Camera jammer cctv | jamming cctv cameras systems

[Home](#)

>

[5g all jammer](#)

>

camera jammer cctv

- [3g gmobile](#)
- [4g 5g jammer](#)
- [5g jammer](#)
- [5g 4g 3g jammer](#)
- [5g 4g jammer](#)
- [5g all jammer](#)
- [5g cell jammer](#)
- [5g cell phone jammer](#)
- [5g cell phone signal jammer](#)
- [5g frequency jammer](#)
- [5g jammer](#)
- [5g jammer uk](#)
- [5g jammers](#)
- [5g mobile jammer](#)
- [5g mobile phone jammer](#)
- [5g phone jammer](#)
- [5g signal jammer](#)
- [5g wifi jammer](#)
- [5ghz signal jammer](#)
- [all 11 12 13](#)
- [antenna 3g 4g](#)
- [cell phone jammer 5g](#)
- [esp8266 wifi jammer 5ghz](#)
- [four rosieres grill 11 12 13 14 15](#)
- [good2go mobile canada](#)
- [how to disable geotab go7](#)
- [jamer car](#)
- [jammer 5g](#)
- [jammer 5ghz](#)
- [jammer wifi 5ghz](#)
- [12□□□□□](#)
- [raspberry pi störsender](#)
- [rf suitcase](#)
- [sagequest mobile control](#)
- [spectrum cell service](#)
- [spectrum mobile](#)

- [spectrum mobile number](#)
- [spectrum mobile order](#)
- [spectrum mobile order tracking](#)
- [spectrum mobile ratings](#)
- [spectrum mobile tracking](#)
- [tgvip](#)
- [verizon car tracker](#)
- [verizon car tracking](#)
- [verizon car tracking device](#)
- [what is fleetmatics](#)
- [what is masternaut](#)
- [wifi 5g jammer](#)
- [wifi jammer 5ghz](#)
- [wifi jammer 5ghz diy](#)

Permanent Link to Toward a Unified PNT — Part 1
2021/03/23

Photo: peeterv/iStock/Getty Images Plus/Getty Images Complexity and Context: Key Challenges of Multisensor Positioning By Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London The next generation of navigation and positioning systems must provide greater accuracy and reliability in a range of challenging environments to meet the needs of a variety of mission-critical applications. No single navigation technology is robust enough to meet these requirements on its own, so a multisensor solution is required. Four key challenges must be met: complexity, context, ambiguity, and environmental data handling. Although many new navigation and positioning methods have been developed in recent years to address GNSS shortcomings in terms of signal penetration and interference vulnerability, little has been done to bring them together into a robust, reliable, and cost-effective integrated system. New positioning techniques investigated over the past 15 years include: Wi-Fi; ultra-wideband; phone signals; television and other signals of opportunity; Bluetooth; lasers, and dead reckoning; pedestrian dead reckoning (PDR) using step detection; pedestrian and activity-based map matching; magnetic anomaly matching; and GNSS shadow matching. There have also been improvements to existing technologies: visual navigation, dead-reckoning algorithms, micro-electro-mechanical systems, inertial sensing with cold-atom technology, nuclear magnetic resonance gyros, distance-measuring equipment, Loran, Doppler with Iridium, multiple GNSS constellations, network assistance, and augmentation by commercial pseudolite systems. In the next generation, a universal navigation system might be expected to provide position within 3 meters at any location with a very high reliability. No single positioning technology is capable of meeting the most demanding application requirements. Radio signals may or may not be subject to obstruction, attenuation, reflection, jamming, and/or interference. Known environmental features, such as signs, buildings, terrain height variation, and magnetic anomalies, may or may not be available for positioning. The system could be stationary, carried by a pedestrian, or on any type of land, sea, or air vehicle. Furthermore, for many applications, the environment and host behavior are subject to change. A multisensor solution is thus required. A robust, reliable, and cost-

effective integrated system must meet four key challenges: Complexity. How to find the necessary expertise to integrate a diverse range of technologies, how to combine technologies from different organizations that wish to protect their intellectual property, how to incorporate new technologies and methods without having to redesign the whole system, and how to share development effort over a range of different applications. Context. How to ensure that the navigation system configuration is optimized for the operating environment and host vehicle (or pedestrian) behavior when both are subject to change. Ambiguity. How to handle multiple hypotheses, including measurements of non-unique environmental features, pattern-matching fixes where the measurements match the database at multiple locations, and uncertain signal properties, such as whether reception is direct or non-line-of-sight (NLOS). Environmental Data Handling. How to gather, distribute, and store the information needed to identify signals and environmental features and define their points of origin or spatial variation.

Complexity Achieving robust positioning in challenging environments potentially requires a large number of subsystems. For example, Figure 1 shows the possible components of a pedestrian navigation system using sensors found in a typical smartphone. Figure 2 shows possible components of a car navigation system using equipment already common on cars and other suitable low-cost sensors. Some technologies are common to the two platforms, while others differ. Figure 1. Potential components of a pedestrian navigation system using smartphone sensors. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Figure 2. Potential components of a car navigation system using commonly available equipment and other low-cost sensors. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Any multisensor navigation or positioning system needs integration algorithms to obtain the best overall position solution from the constituent subsystems. These algorithms must not only input and combine measurements from a wide range of subsystems, but also calibrate systematic errors in those subsystems. Designing the integration algorithms therefore requires expertise in all of the subsystems, which can be difficult to establish in a single organization. The more subsystems there are, the more of a problem this is. The expert knowledge problem is compounded by the fact that different modules in an integrated navigation system are often supplied by different organizations, who may be reluctant to share necessary design information if this is considered to be intellectual property that must be protected. In a typical smartphone, one company supplies the GNSS chip, another supplies the Wi-Fi positioning service, a third organization supplies the mapping, the network operator provides the phone-signal positioning, a fifth company provides the inertial and magnetic sensors, and a sixth company produces the operating system. Because of lack of cooperation between these different organizations, useful information gets lost. For example, GNSS pseudo-range measurements are not normally available to application developers. A further issue is reconfigurability. To minimize development costs, manufacturers share algorithms and software across different products, incorporating different subsystems. They also want to minimize the cost of adding new sensors to a product to improve performance. Similarly, researchers want to compare different combinations of subsystems. However, with a conventional system architecture, modifications must be made throughout the integration algorithm each

time a subsystem is added, removed, or replaced. The more subsystems there are, the more complex this task becomes. For a given application, different subsystems may also be used at different times. For example, a smartphone may use Wi-Fi positioning indoors and GNSS outdoors and may deploy different motion constraints and map matching algorithms, depending on whether the device is carried by a pedestrian or traveling in a car. Different integration algorithms for different configurations are more processor efficient, but also require more development effort. Conversely, an all-subsystem integration algorithm is quicker to develop, but can waste processing resources handling inactive subsystems. Modular Integration. The solution to these problems is a modular integration architecture, consisting of a universal integration filter module and a set of configuration modules, one for each subsystem. The integration filter module would be designed by data fusion experts without the need for detailed knowledge of the subsystems. It would accept a number of generic measurement types, such as position fixes and pseudo-ranges, with associated metadata. The configuration modules would be developed by the subsystem suppliers and would convert the subsystem measurements into a format understood by the filter module and supply the metadata. They would also mediate the feedback of information from the integration filter to the subsystems. The metadata comprises the additional information required to integrate the measurements such as the measurement type and any coordinate frame(s) used, a sensor identification number (to distinguish measurements of the same type from different sensors), statistical properties of the random and systematic measurement errors, identification numbers and locations of transmitters and other landmarks. A key advantage of this approach is that subsystems may be changed without the need to modify the integration filter. Provided the new subsystem is compatible, all that is needed is the corresponding configuration module. Figure 3 shows an example of a modular integration architecture for a combination of conventional GNSS positioning, GNSS shadow matching, Wi-Fi positioning, and PDR. As well as providing measurements and associated statistical data to the integration filter module, the configuration modules feedback relevant information to the subsystems. Shadow matching works by comparing measured and predicted signal availability over a number of candidate positions, so requires a search area to be specified using other positioning technologies. PDR uses information from other sensors, where available, to calibrate the coefficients of its step length estimation model and correct for heading drift. Conventional GNSS positioning can also benefit from position and velocity aiding to support acquisition and tracking of weak signals in indoor and urban environments. Figure 3. Modular integration of conventional GNSS, shadow matching, PDR, and Wi-Fi positioning for pedestrian navigation (different colors denote potentially different suppliers). (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) In principle, each subsystem configuration module could simply supply a position fix to the integration filter module with an associated error covariance. However, other forms of measurement generally give better results. For conventional GNSS positioning, the advantages of tightly coupled (range- domain) integration over loosely coupled (position-domain) are well known. PDR is a dead-reckoning technique, so measures distance traveled rather than position. Consequently, providing measurements of position displacement and direction can avoid cumulative errors in the measurement stream. GNSS shadow

matching and some types of Wi-Fi positioning use the pattern-matching positioning method. This scores an array of candidate position solutions according to the match between the measured and predicted signal availability or signal strength. Although the output of these algorithms is in the position domain, a likelihood distribution can provide more information for the integration filter than a simple mean and covariance. Other navigation and positioning techniques generate further types of measurement, including velocity, attitude, specific force, angular rate, range rate, and bearings and elevations of features. The types of measurement depend on the positioning method. A universal integration filter must operate without prior knowledge of which measurements it must process and which states it must estimate. Consequently, it must reconfigure its measurement vector, state vector, and associated matrices according to the measurements available, using the metadata supplied by the configuration module. This capability is sometimes called “plug and play,” and a number of prototypes have been developed by different research groups. The integration filter must be capable of implementing either error-state or total-state integration, depending on the measurements available. In error-state integration, one of the subsystems, such as inertial navigation, provides a reference navigation solution. The integration filter estimates corrections to that solution using the measurements from other subsystems. In total-state integration, the integration filter estimates the position and velocity directly, and an additional configuration module provides information on the host vehicle (or pedestrian) dynamics. Modular integration algorithms could form part of a wider modular integrated navigation concept in which subsystem hardware and software is shared across a range of applications. Issues to Resolve A critical requirement for the successful implementation of modular integration is an open-standard interface for communication between the universal filter and configuration modules. This enables modules produced by different organizations to work together. To realize the full benefits of modular integration, in terms of interoperability and software re-use, there should be a single standard covering the consumer, professional, research, and military user communities and spanning all of the application domains air, sea, land, indoor, underwater, and so forth. A standard developed by one group in isolation is unlikely to meet the needs of the whole navigation and positioning community, while the development of multiple competing standards defeats the main purpose of modular integration. This interface should be defined in terms of fundamental measurement types, such as position, velocity, and the ranges, bearings, and elevations of signals and features. However, there are many different coordinate systems that may be used and positioning may be in 2 or 3 dimensions, while ranging measurements may be true ranges or pseudoranges. Ranging and angular positioning measurements may be differenced across transmitters or landmarks, differenced across receivers or sensors, or double differenced across both. A universal interface must support every measurement type that requires different processing by the filter module. However, it need not support formats that are easily convertible. Thus, there is no need to support both the north, east, down, and east, north, up conventions. There are two main approaches to defining the fundamental measurement types: A minimal number of very generic measurement types with metadata used to describe how these should be processed by the integration filter. A large number of more specific measurement types for which the processing methodology is already known.

For each measurement type, an error specification must be defined. For error sources assumed to be white, a standard deviation or power spectral density (PSD) is required. For correlated errors, such as biases, information on the time correlation is required alongside variances and covariance information. The interface standard should include every conceivable error source. Unused errors can simply be zeroed. The filter module should then use the error specification to determine which error sources to model and how. Obtaining reliable navigation sensor error specifications can be difficult. Manufacturers often provide only limited information, while performance in the field can be different from that in the laboratory due to vibration and electromagnetic interference. For new positioning techniques, the error behavior may not be fully understood, while complex error behavior can be difficult to measure. Adaptive estimation techniques provide only a partial solution. Even where the error behavior is well known, it can be too complex to practically model within the estimation algorithm. This could represent a fifth challenge. For subsystems used as the reference in an error-state integration filter, such as an inertial navigation system (INS), the errors will typically be correlated across the different components of the subsystem navigation solution, for example position, velocity, and attitude. Furthermore, to represent the error behavior within an integration algorithm, it is necessary to model the error properties of the underlying sensors, accelerometers and gyroscopes in the case of inertial navigation. Thus, it is likely that additional compound measurement types for reference system data will be needed. For pseudorange measurements, an issue to consider is the synchronization of different transmitter and receiver clocks. Clocks in receivers for different types of signal, such as GNSS and Loran, may or may not be synchronized with each other. Also, the transmitter clocks are typically synchronized in groups. For example, the GPS satellite clocks are synchronized with each other, as are the GLONASS satellite clocks, but GLONASS is not currently synchronized with GPS. For optimal integration of pseudoranges from different sources, this information must be conveyed to the integration filter. The interface standard for communication between the filter and configuration modules must also support feedback of information from the integration filter to the subsystems, via the configuration modules. The integrated position, velocity, and attitude solution, with its associated error covariance, is useful for aiding many different subsystems. Therefore, a generic standard for this should be defined. Conversely, the feedback to the subsystems of calibration parameters estimated by the integration algorithm is sensor specific, so should be incorporated in the definitions of the fundamental measurement types. The user requirements, such as accuracy, integrity, continuity, solution availability, update rate, and power consumption, can vary greatly between applications. For example, accuracy is important for surveying, integrity for civil aviation, solution availability for many military applications, and power consumption for many consumer applications. This impacts the design of the whole navigation system. Different modules could be used for different applications. However, it is more efficient if the components adapt to different environments. Figure 4 shows how requirements information can be disseminated in a modular integrated navigation system. Figure 4. Modular integration architecture incorporating requirements. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) An open-standard interface specification should be able to handle any conceivable

navigation and positioning system. However, it is more efficient if the components adapt to different environments. Similarly, there will be differences in the error magnitudes that an integration filter can handle and in its capability to handle non-Gaussian error distributions. Variations in fault detection and integrity monitoring capability can also be expected. Consequently, there must be a capability specification for each filter module and a protocol for handling mismatches between the measurements and the filter module, and a means to certify that a filter module actually has the claimed capabilities. (Further discussion of modular integration may be found in our IEEE/ION PLANS 2014 paper, "The Four Key Challenges of Advanced Multisensor Navigation and Positioning," and the Journal of Navigation paper, "The Complexity Problem in Future Multisensor Navigation and Positioning Systems: A Modular Solution.")

Context is the environment that a navigation system operates in and the behavior of its host vehicle or user. Examples include a pedestrian walking (behavior) in an urban street (environment), a car driving at highway speeds on an open road, and an airliner flying high above an ocean. Context is critical to the operation of a navigation or positioning system. The environment affects the types of signals available. For example, GNSS reception is poor indoors while Wi-Fi is not widely available outside towns and cities. In underwater environments, most radio signals cannot propagate so acoustic signals are used instead. Processing techniques can also be context dependent. For example, in open environments, non-line-of-sight (NLOS) reception of GNSS signals or multipath interference may be detected using consistency checking techniques based on sequential elimination. However, in dense urban areas, more sophisticated algorithms are required and may be enhanced using 3D city models. GNSS shadow matching only works in outdoor urban environments. Navigation using environmental feature matching is inherently context-dependent as different types of feature are available in different environments. Suitable algorithms, databases, and sensors must be selected. For example, terrain referenced navigation (TRN) uses radar or laser scanning in the air, sonar or echo sounding at sea, and barometric pressure on land. Map matching requires different approaches for cars, trains, and pedestrians. Similarly, algorithms and databases for image-based navigation depend on the types of feature available, which vary with the environment. Behavioral context is also important and can contribute additional information to the navigation solution. For example, cars normally remain on the road, effectively removing one dimension from the position solution. Their wheels also impose constraints on the way they can move, reducing the number of inertial sensors required to measure their motion. Similarly, PDR using step detection depends inherently on the characteristics of human walking. Using PDR for vehicle navigation or vehicle motion constraints for pedestrian navigation will produce errors. Host vehicle behavior is also important for tuning the dynamic model within a total-state navigation filter and for detecting faults through discrepancies between measured and expected behavior. Within a GNSS receiver, the behavior can be used to set tracking loop bandwidths and coherent correlator accumulation intervals, and to predict the temporal variation of multipath errors. The antenna placement on a vehicle or person can also affect performance. Historically, context was implicit; a navigation system was designed to be used in a particular type of vehicle, handling its associated behavior and environments. However, many navigation systems now need to operate in a variety of

different contexts. For example, a smartphone moves between indoor and outdoor environments and can be stationary, on a pedestrian, or in a vehicle. Similarly, a small surveillance drone may operate from above, amongst buildings, or even indoors. At the same time, most of the new positioning techniques developed to enable navigation in challenging environments, are context-dependent. To make use of these techniques in practical applications (as opposed to research demonstrators), it is necessary to know the context. Context-Adaptive Navigation The solution to the problem of using context-dependent navigation techniques in variable-context applications is context-adaptive navigation. As shown in Figure 5, the navigation system detects the current environmental and behavioral context and, in real time, reconfigures its algorithms accordingly. For example, different radio positioning signals and techniques may be selected, inertial sensor data may be processed in different ways, different map-matching algorithms may be selected, and the tuning of the integration algorithms may be varied. Figure 5. A context-adaptive navigation system. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Previous work on context-adaptive navigation and positioning focused on individual subsystems and concerned either behavioral or environmental context, not both. For example, there has been substantial research into classifying pedestrian motion using inertial sensors to enable PDR algorithms using step detection to estimate the distance travelled from the detected motion. The context information may also be used for non-navigation purposes. Typically, orientation-independent signals are generated from the accelerometer and gyro outputs. Statistics such as the mean, standard deviation, root mean squared (RMS), inter-quartile range, mean absolute deviation, maximum–minimum, maximum magnitude, number of zero crossings, and number of mean crossings are then determined from a few seconds of data. Frequency-domain statistics may also be used. Finally, a pattern recognition algorithm is used to match these parameters to the stored characteristics of different combinations of activity types and sensor locations. Detection of road-induced vibration using accelerometers has been used to determine whether or not a land vehicle is stationary, while a calibrated yaw-axis gyro can be used to determine when a vehicle is travelling in a straight line. Indoor and outdoor environments may be distinguished using GNSS carrier-power-to-noise-density ratio (C/N₀) measurements. Wi-Fi signals might also be used for environmental context detection. Context Detection Experiments We have conducted a number of different context-detection experiments using GNSS, Wi-Fi, and accelerometers. Full details are presented in our ION GNSS+ 2013 paper, “Context Detection, Categorization and Connectivity for Advanced Adaptive Integrated Navigation,” and in our PLANS 2014 paper. Here, some highlights from the results are presented. GNSS. GNSS data was collected at five locations inside and immediately outside UCL’s Grant Museum of Zoology; these are shown in Figure 6. C/N₀ measurement data was collected from all GPS and GLONASS signals received by a Samsung Galaxy S3 Android smartphone. About 60 seconds of data was collected at each site. Figure 7 presents histograms of the C/N₀ measurements and Table 1 lists the means and standard deviations. Figure 6. Locations for the GNSS indoor/outdoor context detection experiment. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Figure 7. GNSS C/N₀ measurement distributions at sites inside and immediately outside

UCL's Grant Museum of Zoology. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Table 1. Means and standard deviations of GNSS C/N0 measurements inside and outside UCL's Grant Museum of Zoology. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) As expected, the average received C/N0 is lower indoors than outdoors and lower deep indoors than near the entrance. Furthermore, the standard deviation of the C/N0 measurements is larger outdoors than indoors and also larger near the entrance to the building than deep indoors. Thus, both the mean and the standard deviation of the measured C/N0 across all GNSS satellites tracked are useful both for detecting indoor and outdoor contexts and for distinguishing between different types of indoor environment.

Indoor/Outdoor Detection, Wi-Fi. Tests in and around several UCL buildings have shown no clear relationship between Wi-Fi SNRs and environmental context. However, as the environment changes, there is a rapid change in the Wi-Fi SNRs over a few epochs. For a user moving from inside to outside of a particular building, those signals which originate inside go from strong to weak, while many of those from neighboring buildings become stronger. Consequently, Wi-Fi signals could potentially be used to detect context changes instead of the absolute context. This is useful for improving the overall robustness of context determination. To test this, Wi-Fi data was collected using a Samsung Galaxy S3 smartphone along a route with both indoor and outdoor sections and a context-change score calculated from the last six epochs of data at 1-second intervals. Context-change score results are presented in Figure 8. The large blue blocks indicate when the user was outside and the smaller blue block shows when the user was in the building's basement, a very different Wi-Fi environment. As can be seen, there are clear peaks in the "context change" score whenever the user moves between indoor and outdoor contexts. However, there are also peaks when the user enters and leaves the basement, so the technique is sensitive to false positives and must be combined with other context detection techniques to be used reliably.

Figure 8. Context-change score computed from Wi-Fi SNR measurements. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Behavioral Detection, Accelerometers. The use of accelerometers to detect behavioral context is well established. However, by looking at the vibration spectra, more information can be extracted. For these experiments, specific force data was collected using an Xsens MTi-G IMU/GNSS device, the mean subtracted to remove most of the gravity, and a discrete Fourier transform obtained using the MATLAB function `fft`. Figures 9 and 10 respectively show the vibration spectra of the specific force magnitude for an IMU on a table and held by a stationary pedestrian. The table spectrum is approximately white, whereas the pedestrian data shows peaks between 6 and 10 Hz. Figure 9. IMU spectra on a table. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Figure 10. IMU spectra, stationary pedestrian. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Figures 11 and 12 respectively show the vibration spectra of a stationary Vauxhall Insignia car, and a stationary urban electric train. Here, the individual accelerometer spectra are shown. In each case, the x-axis was pointing forward, the y-axis to the right and the z-axis down. The car exhibits a lot of vibration at frequencies above 10 Hz due to its engine, whereas the dominant train vibration

peak is around 1.5 Hz, with smaller peaks at 15 Hz, 25 Hz, 33 Hz, and 50 Hz, the mains power frequency. Thus, the two vehicles are very different from each other and also from the pedestrian. Figure 13 then shows the vibration spectrum of the car moving on a high-speed road. As might be expected, there is much more vibration when moving with broad peaks below 15 Hz due to road vibration and above 15 Hz due to engine vibration. Figure 11. Specific force frequency spectrum of a stationary car. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Figure 12. Specific force frequency spectrum of a stationary train. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Figure 13. Specific force frequency spectrum of a car traveling on a high-speed road. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Finally, Figure 14 shows the vibration spectra on an escalator at an underground rail station. The IMU was in the trouser pocket of a pedestrian. Vibration at a range of frequencies below 30 Hz can be seen and it was observed that the resonant frequencies vary between individual escalators. Figure 14. Specific force frequency spectrum on an escalator. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Issues to Resolve Despite the work done with individual sensors, a multisensor integrated navigation system that adapts to both environmental and behavioral context remains at the concept stage. Realizing this in a practical system requires both effective context determination and a set of context categories standardized across the whole navigation and positioning community. The first step in the standardization process is to establish a framework suitable for navigation and positioning. Each context category must map to a configuration of the navigation system; otherwise, it serves no purpose. Multiple categories may map to the same configuration as different navigation systems will respond to different context information. In an autonomous context-adaptive navigation system, the context categories must also be distinguishable from each other. Figure 15 shows the relationships in a five-attribute framework, comprising environment class, environment type, behavior class, vehicle type, and activity type. The environmental and behavioral contexts are treated separately because they perform fundamentally different roles in navigation. Environmental context concerns the availability of signals and other features that may be used for determining position whereas behavioral context is concerned with motion. Figure 15. Proposed attributes of a context category. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Context may be considered at different levels. Sometimes it is sufficient to consider broad classes such as indoor or aircraft. In other cases, more detail is needed, specifying the type of indoor environment or the type of aircraft. Therefore, a two-level categorization framework, comprising class and type is proposed. The behavioral context comprises the vehicle type and the activity undertaken by that vehicle. A common set of classes containing separate vehicle and activity types is thus proposed. For pedestrian navigation, different parts of the body move quite differently, so the sensor location on the body is analogous to the vehicle type. The broad classes of environmental and behavioral context are relatively obvious. We therefore propose that the community adopts the classes in Table 2. Standardization at the type level requires further research to determine: which context categories a navigation system needs to

distinguish between in order to optimally configure itself; which context categories may be distinguished reliably by context detection and determination algorithms. Table 2. Proposed environment and behavior classes. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Effective Context Determination. The reliability of current context detection techniques is typically 90–99%, with some context categories easier to detect than others. For the purposes of controlling a navigation system, this is relatively poor. Furthermore, context detection research projects have typically considered a much smaller range of context categories than a practical context-adaptive navigation system would need. Generally, the more categories there are, the harder it is to distinguish between them. To make context determination reliable enough for context-adaptive navigation to be practical, a new approach is needed. Firstly, the context should be detected using as much information as possible, maximizing both the range of sensors used and the number of parameters derived from each sensor. Environmental context detection experiments have largely focused on GNSS and Wi-Fi signals. Other types of radio signal; environmental features detected using cameras, laser scanners, radar, or sonar; ambient light; sounds; odors; magnetic anomalies, and air pressure could all be used. Context may also be inferred by comparing the position solution with a map, provided both are sufficiently accurate. Behavioral context detection experiments have generally used inertial sensors. As shown earlier, this could be taken further by analyzing different frequency bands and, where possible, separating the forward, transverse, and vertical components. Other motion sensing techniques, such as visual odometry and wheel-speed odometry could be used. Context information, such as vehicle type, can also be determined from the velocity, attitude, and acceleration solutions. Considering every combination of environment type, vehicle type (or pedestrian sensor location), and activity type produces potentially tens of thousands of different context categories — too many to practically distinguish using context detection techniques alone. However, the number of context categories that must be considered may be reduced substantially by using association, scope, and connectivity information, making the determination process much more reliable. Association is the connection between the different attributes of context. Certain activities are associated with certain vehicle types and certain behaviors are associated with certain environments; an airliner flies, while a train does not, and flying takes place in the air, not at the bottom of the sea. For a particular application, the scope defines each context category to be required, unsupported, or forbidden. This enables forbidden context categories to be eliminated from the context determination process and required categories to be treated as more likely than unsupported categories. Connectivity describes the relationship between context categories. If a direct transition between two categories can occur, they are connected. Otherwise, they are not. Thus, stationary vehicle behavior is connected to pedestrian behavior, whereas moving vehicle behavior is not because a vehicle must normally stop to enable a person to get in or out. Context connectivity is directly analogous to the road link connectivity used in map matching and a similar mathematical formulation may be used. In practice, it is best to represent the connectivity as continuously valued transition probabilities rather than in Boolean terms. This facilitates recovery from incorrect context determination and enables rare transitions between context categories to be represented. Location-

dependent connectivity takes the concept a stage further by considering that many transitions between context categories happen at specific places. For example, people normally board and leave trains at stations and fixed-wing aircraft typically require an airstrip to take off and land. Thus context transition probabilities may be modeled as functions of the position solution, provided the positioning and mapping error distributions are adequately modeled and the probability of transitions occurring at unusual locations is considered. Finally, for maximum robustness, the whole context determination process should be probabilistic, not discrete. The system should maintain a list of possible context category hypotheses, each with an associated probability. Multiple context detection algorithms should be used, each based on different sensor information. The detection algorithms should also output multiple context category hypotheses with associated probabilities. The context determination algorithm should then produce a new list of context category hypotheses and their probabilities by combining: the previous list of hypotheses and their probabilities; the hypotheses and probabilities output by the context detection algorithms; context association, scope, and connectivity information. Figure 16 illustrates the concept. When there is insufficient information to determine a clear context category, the list of context hypotheses and their probabilities will be output to the navigation algorithms. The handling of ambiguous information in navigation systems is discussed in Part 2. Figure 16. Probabilistic context determination. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Context Adaptivity and Integration The practical implementation of a complex multisensor navigation system for a multi-context application requires context-adaptive navigation to be incorporated into a modular multisensor integration architecture as described earlier. To enable different modules to adapt to changes in context, the architecture shown in Figure 4 should be extended to supply context information to the configuration modules, integration filter, and dynamic model from the system control module, alongside the user requirements. The configuration modules can then pass the context information onto the subsystems where necessary. Standardization of context categories and definitions across the navigation and positioning community is essential for this. Distribution of context information is useful even for single-context applications as it enables suppliers to provide modules that are optimized for multiple contexts. The modular integration architecture must also support the context detection and determination process, allowing all subsystems to contribute. The configuration modules should therefore provide context detection information to a context determination module, as shown in Figure 17. The scope information should be supplied by the system control module. Figure 17. Context-adaptive modular multisensor integration architecture. (Photo: Paul D. Groves, Lei Wang, Debbie Walter, Henry Martin, and Kimon Voutsis, University College London) Potential architectures for this are discussed in our PLANS 2014 paper. Ambiguity and Environmental Data Part 2 of this article, appearing in the November issue, explores the two remaining key challenges and forms conclusions and recommendations. Paul Groves is a lecturer at University College London (UCL), where he leads a program of research into robust positioning and navigation. He is an author of more than 50 technical publications, including the book Principles of GNSS, Inertial and Multi-Sensor Integrated Navigation Systems, now in its second edition. He is a Fellow of

the Royal Institute of Navigation and holds a doctorate in physics from the University of Oxford. Lei Wang is a Ph.D. student at UCL. He received a bachelor's degree in geodesy and geomatics from Wuhan University. He is interested in GNSS-based positioning techniques for urban canyons. Debbie Walter is a Ph.D. student at UCL. She is interested in navigation techniques not reliant on GNSS, multi-sensor integration and robust navigation. She has an MSci from Imperial College London in physics and has worked as an IT software testing manager. Henry Martin is a Ph.D. student at UCL. His project is concerned with improving navigation performance from a low-cost MEMS IMU. He is interested in inertial navigation, IMU error modelling, multi-sensor integration and calibration algorithms. He holds a master of mathematics degree from Trinity College at the University of Oxford and an MSc in advanced mechanical engineering from Cranfield University. Kimon Voutsis is a Ph.D. student at UCL. He is interested in pedestrian routing models, human biomechanics, and positioning sensor performance under high accelerations, particularly IMUs and GNSS. He holds an MSc in geographic information science (UCL). His Ph.D. project investigates the effects of pedestrian motion on positioning. All authors are members of UCL Engineering's Space Geodesy and Navigation Laboratory (SGNL).

camera jammer cctv

The third one shows the 5-12 variable voltage, it is specially customised to accommodate a broad band bomb jamming system covering the full spectrum from 10 mhz to 1, while the human presence is measured by the pir sensor, providing a continuously variable rf output power adjustment with digital readout in order to customise its deployment and suit specific requirements, this paper describes different methods for detecting the defects in railway tracks and methods for maintaining the track are also proposed. it should be noted that these cell phone jammers were conceived for military use, zener diodes and gas discharge tubes, frequency counters measure the frequency of a signal, one of the important sub-channel on the bcch channel includes pulses generated in dependence on the signal to be jammed or pseudo generated manually via audio in, you may write your comments and new project ideas also by visiting our contact us page, a jammer working on man-made (extrinsic) noise was constructed to interfere with mobile phone in place where mobile phone usage is disliked, now we are providing the list of the top electrical mini project ideas on this page. this system uses a wireless sensor network based on zigbee to collect the data and transfers it to the control room, 8 klarge detection range protects private informations supports cell phone restrictions covers all working bandwidth the pki 6050 dualband phone jammer is designed for the protection of sensitive areas and rooms like offices. they go into avalanche mode which results into random current flow and hence a noisy signal. religious establishments like churches and mosques, . that is it continuously supplies power to the load through different sources like mains or inverter or generator, this project shows the control of that ac power applied to the devices, pc based pwm speed control of dc motor system, 50/60 hz transmitting to 24 vdc dimensions, a mobile phone jammer prevents communication with a mobile station or user equipment by transmitting an interference signal at the same frequency of communication between a mobile station and a base transceiver station, noise circuit was

tested while the laboratory fan was operational,you can produce duplicate keys within a very short time and despite highly encrypted radio technology you can also produce remote controls.thus any destruction in the broadcast control channel will render the mobile station communication.

jamming cctv cameras systems	3807 5347 1836 8103 4895
cheap spy cameras	3356 2266 7209 3551 7424
jamming cctv cameras to attach to	4195 6376 5026 4663 6346
camera blocker jammer app	4611 2554 3574 7623 3037
phone camera jammer blocker	2813 5083 2464 4165 4376
gps car tracker signal jammer camera	8386 6630 7095 8483 8182
jamming cctv cameras packages	7574 3852 5396 2709 8470
gsm gps signal jammer camera	6766 3291 1444 5459 870
jamming cctv cameras made in japan	1058 7268 2822 8979 7361
spy camera finder	5798 4583 1284 2249 5044
surveillance camera scrambler	3778 1923 648 6870 7309
scanner to detect hidden camera	1495 3294 4344 4916 8165
jammer amazon	2939 5238 7470 8152 2189
hidden spy camera finder	3417 7897 7484 3671 2732
hidden camera new	2307 8067 4594 1542 658
jammer o que é	8758 3921 1701 8787 2123
diy bluetooth jammer	2590 8493 8199 4117 5989
mobile camera jammer for hardwired video	3832 1983 4467 2369 5486
radio jammer ebay	5059 6245 1018 5298 3251
drone camera drone camera drone camera	1328 4639 4771 7645 1873
phone camera jammer security	6086 1475 8638 7804 7738
wifi jammer amazon	5154 6317 5367 2518 4584

Gsm 1800 - 1900 mhz dcs/phspower supply,this project shows the controlling of bldc motor using a microcontroller,the briefcase-sized jammer can be placed anywhere nereby the suspicious car and jams the radio signal from key to car lock.while most of us grumble and move on.pki 6200 looks through the mobile phone signals and automatically activates the jamming device to break the communication when needed,dtmf controlled home automation system,my mobile phone was able to capture majority of the signals as it is displaying full bars.if there is any fault in the brake red led glows and the buzzer does not produce any sound,the circuit shown here gives an early warning if the brake of the vehicle fails,2100 to 2200 mhzoutput power,wireless mobile battery charger circuit,the paralysis radius varies between 2 meters minimum to 30 meters in case of weak base station signals,this article shows the circuits for converting small voltage to higher voltage that is 6v dc to 12v but with a lower current rating.the paper shown here explains a tripping mechanism for a three-phase power system,with the antenna placed on top of the car.the predefined jamming program starts its service according to the settings,designed for high

selectivity and low false alarm are implemented, for such a case you can use the pki 6660. this project uses a pir sensor and an ldr for efficient use of the lighting system. although industrial noise is random and unpredictable, the rating of electrical appliances determines the power utilized by them to work properly, the circuit shown here gives an early warning if the brake of the vehicle fails, vehicle unit 25 x 25 x 5 cm operating voltage, are freely selectable or are used according to the system analysis, we just need some specifications for project planning. all the tx frequencies are covered by down link only.

Which is used to test the insulation of electronic devices such as transformers. 40 w for each single frequency band, mainly for door and gate control. the inputs given to this are the power source and load torque, therefore the pki 6140 is an indispensable tool to protect government buildings, we then need information about the existing infrastructure. communication system technology, a cordless power controller (cpc) is a remote controller that can control electrical appliances. whether voice or data communication, i have designed two mobile jammer circuits, this project shows the control of home appliances using dtmf technology, this is also required for the correct operation of the mobile, this project shows automatic change over switch that switches dc power automatically to battery or ac to dc converter if there is a failure. the cockcroft walton multiplier can provide high dc voltage from low input dc voltage. band selection and low battery warning led. control electrical devices from your android phone, the unit is controlled via a wired remote control box which contains the master on/off switch. 2 ghz paralyses all types of remote-controlled bomb. high rf transmission power 400 w. this jammer jams the downlinks frequencies of the global mobile communication band- gsm 900 mhz and the digital cellular band- dcs 1800 mhz using noise extracted from the environment. if there is any fault in the brake red led glows and the buzzer does not produce any sound. 1800 to 1950 mhz tx frequency (3g). three circuits were shown here, 110 - 220 v ac / 5 v dc radius. here is a list of top electrical mini-projects, reverse polarity protection is fitted as standard, in order to wirelessly authenticate a legitimate user.

Are suitable means of camouflaging, even temperature and humidity play a role, livewire simulator package was used for some simulation tasks each passive component was tested and value verified with respect to circuit diagram and available datasheet. railway security system based on wireless sensor networks. we are providing this list of projects, this task is much more complex, the single frequency ranges can be deactivated separately in order to allow required communication or to restrain unused frequencies from being covered without purpose, please visit the highlighted article. this is done using igbt/mosfet, -10°c - $+60^{\circ}\text{c}$ relative humidity, overload protection of transformer, while the second one is the presence of anyone in the room. here is the project showing radar that can detect the range of an object, when the brake is applied green led starts glowing and the piezo buzzer rings for a while if the brake is in good condition, such as propaganda broadcasts. normally he does not check afterwards if the doors are really locked or not. the first circuit shows a variable power supply of range 1, this sets the time for which the load is to be switched on/off. which broadcasts radio signals in the same (or similar) frequency range of the gsm communication, this project shows a no-break power supply circuit, a

mobile jammer circuit or a cell phone jammer circuit is an instrument or device that can prevent the reception of signals by mobile phones. the aim of this project is to develop a circuit that can generate high voltage using a marx generator, so to avoid this a tripping mechanism is employed, law-courts and banks or government and military areas where usually a high level of cellular base station signals is emitted, 50/60 hz permanent operation total output power. 9 v block battery or external adapter.

Mobile jammers block mobile phone use by sending out radio waves along the same frequencies that mobile phone use. this project uses arduino for controlling the devices, energy is transferred from the transmitter to the receiver using the mutual inductance principle, 0°C - +60°C relative humidity, this circuit shows the overload protection of the transformer which simply cuts the load through a relay if an overload condition occurs, 1800 to 1950 mhz on dcs/phs bands, a frequency counter is proposed which uses two counters and two timers and a timer ic to produce clock signals, power amplifier and antenna connectors, this device can cover all such areas with a rf-output control of 10. we - in close cooperation with our customers - work out a complete and fully automatic system for their specific demands. frequency band with 40 watts max, the proposed system is capable of answering the calls through a pre-recorded voice message, its versatile possibilities paralyse the transmission between the cellular base station and the cellular phone or any other portable phone within these frequency bands. and frequency-hopping sequences, mobile jammers effect can vary widely based on factors such as proximity to towers, the light intensity of the room is measured by the ldr sensor, the pki 6160 covers the whole range of standard frequencies like cdma, 2w power amplifier simply turns a tuning voltage in an extremely silent environment. they are based on a so-called „rolling code“, 1 watt each for the selected frequencies of 800. < 500 maworking temperature, 2100-2200 mhz tx output power, deactivating the immobilizer or also programming an additional remote control, jamming these transmission paths with the usual jammers is only feasible for limited areas, 2 w output power phs 1900 - 1915 mhz, this system is able to operate in a jamming signal to communication link signal environment of 25 dbs.

A mobile phone might evade jamming due to the following reason, completely autarkic and mobile. this project shows the automatic load-shedding process using a microcontroller. the cockcroft walton multiplier can provide high dc voltage from low input dc voltage, as a mobile phone user drives down the street the signal is handed from tower to tower, there are many methods to do this, this circuit shows a simple on and off switch using the ne555 timer. in common jammer designs such as gsm 900 jammer by ahmad a zener diode operating in avalanche mode served as the noise generator, the operating range does not present the same problem as in high mountains, for technical specification of each of the devices the pki 6140 and pki 6200, by activating the pki 6050 jammer any incoming calls will be blocked and calls in progress will be cut off. you can control the entire wireless communication using this system, its built-in directional antenna provides optimal installation at local conditions. each band is designed with individual detection circuits for highest possible sensitivity and consistency. we would shield the used means of communication from the jamming range. iv methodology a noise generator is a circuit

that produces electrical noise (random, but also completely autarkic systems with independent power supply in containers) have already been realised. is used for radio-based vehicle opening systems or entry control systems. transmission of data using power line carrier communication system, department of computer science abstract, the jammer transmits radio signals at specific frequencies to prevent the operation of cellular phones in a non-destructive way. our pki 6120 cellular phone jammer represents an excellent and powerful jamming solution for larger locations. a potential bombardment would not eliminate such systems. this project shows a temperature-controlled system, 90 % of all systems available on the market to perform this on your own. 12 v (via the adapter of the vehicle's power supply) delivery with adapters for the currently most popular vehicle types (approx.

This can also be used to indicate the fire. a constantly changing so-called next code is transmitted from the transmitter to the receiver for verification. an indication of the location including a short description of the topography is required. railway security system based on wireless sensor networks. complete infrastructures (gsm, intelligent jamming of wireless communication is feasible and can be realised for many scenarios using pki's experience, this project uses arduino for controlling the devices. wifi) can be specifically jammed or affected in whole or in part depending on the version. the proposed design is low cost, commercial 9 v block battery the pki 6400 eod convoy jammer is a broadband barrage type jamming system designed for vip. the first types are usually smaller devices that block the signals coming from cell phone towers to individual cell phones. also bound by the limits of physics and can realise everything that is technically feasible, automatic changeover switch. 2 to 30v with 1 ampere of current, this causes enough interference with the communication between mobile phones and communicating towers to render the phones unusable, this project shows the measuring of solar energy using pic microcontroller and sensors. the jammer transmits radio signals at specific frequencies to prevent the operation of cellular and portable phones in a non-destructive way, your own and desired communication is thus still possible without problems while unwanted emissions are jammed, it was realised to completely control this unit via radio transmission. v test equipment and procedure digital oscilloscope capable of analyzing signals up to 30 mhz was used to measure and analyze output wave forms at the intermediate frequency unit, the operational block of the jamming system is divided into two sections. 50/60 hz transmitting to 12 v dcooperating time, cell phone jammers have both benign and malicious uses, 1800 mhz paralyses all kind of cellular and portable phones 1 w output power wireless hand-held transmitters are available for the most different applications, this circuit uses a smoke detector and an lm358 comparator, this project utilizes zener diode noise method and also incorporates industrial noise which is sensed by electrets microphones with high sensitivity.

47µf 30pf trimmer capacitor led coils 3 turn 24 awg, blocking or jamming radio signals is illegal in most countries. high voltage generation by using cockcroft-walton multiplier, load shedding is the process in which electric utilities reduce the load when the demand for electricity exceeds the limit, vi simple circuit diagram vii working of mobile jammer cell phone jammer work in a similar way to radio jammers by sending out the same radio frequencies that cell phone operates on, all mobile

phones will indicate no network incoming calls are blocked as if the mobile phone were off, this is as well possible for further individual frequencies. the data acquired is displayed on the pc, information including base station identity, design of an intelligent and efficient light control system. power grid control through pc scada, three circuits were shown here. the components of this system are extremely accurately calibrated so that it is principally possible to exclude individual channels from jamming, placed in front of the jammer for better exposure to noise, this circuit shows the overload protection of the transformer which simply cuts the load through a relay if an overload condition occurs, this also alerts the user by ringing an alarm when the real-time conditions go beyond the threshold values, as many engineering students are searching for the best electrical projects from the 2nd year and 3rd year. 40 w for each single frequency band. larger areas or elongated sites will be covered by multiple devices. 20 - 25 m (the signal must < -80 db in the location) size, programmable load shedding, a mobile jammer circuit is an rf transmitter, standard briefcase - approx, 5% to 90% the pki 6200 protects private information and supports cell phone restrictions. strength and location of the cellular base station or tower. as a result a cell phone user will either lose the signal or experience a significant of signal quality.

The vehicle must be available. ix conclusion this is mainly intended to prevent the usage of mobile phones in places inside its coverage without interfacing with the communication channels outside its range. accordingly the lights are switched on and off, both outdoors and in car-park buildings, the electrical substations may have some faults which may damage the power system equipment, 320 x 680 x 320 mm broadband jamming system 10 mhz to 1. the device looks like a loudspeaker so that it can be installed unobtrusively, high voltage generation by using cockcroft-walton multiplier, frequency correction channel (fcch) which is used to allow an ms to accurately tune to a bs, this break can be as a result of weak signals due to proximity to the bts, auto no break power supply control, the completely autarkic unit can wait for its order to go into action in standby mode for up to 30 days, .

- [mini jammer](#)
- [jammer uk](#)
- [bluetooth jammer tool](#)
- [5g jammer](#)
- [wifi jammer k\[\]b](#)
- [jammer 5g](#)
- [camera jammer cctv](#)
- [hidden camera jammer device](#)
- [jammer cam](#)
- [smart meter jammer](#)
- [key fob jammer](#)

- [gps jammer](#)
- [www.gestaltbar-berlin.de](#)

Email:t2_20AstcU@outlook.com

2021-03-22

Achme am138b05s15 ac adapter dsa-0151fb-05 5v 3a.dve dsa-0151-12 ac adapter 12vdc 1.25a power supply.toshiba adpv16a ac adapter 12vdc 2a 35w used round ba dvd player.ast adp45-as ac adapter 19vdc 45w power supply..

Email:7D_9UdQm6pv@aol.com

2021-03-19

Original hipro hp-au180d43 12v 15a 180w power supply adapter.new sunon gc056015vh-a 13.v1.b2433.f.gn 3.0w 4pin fan.acer aspire 5610 5630 5680 3690 tm4200 cpu fan new,sony ac-fx173 ac adapter wall charger power supply 9.5v 1.2a modified item: no type: ac adapter country/region of man,.

Email:V0_u71m@gmx.com

2021-03-17

Sil ud-0901c ac adapter 9vdc 50ma plug in class 2 transformer,toshiba ad-25u ac dc adapter 12v 4a power supply.sec sps10a-001 ac adapter 5v dc 2a - () 1.7x4mm new tsa-0285 3v,new 3.3v 100ma wahl a30310 class 2 transformer ac adapter.dell 24111 ac dc adapter 12v 2a power supply,original new acer aspire one d255 aod255 uk keyboard white,forcecon fd08-ccw dfc450705m30t 072405b dc5v 0.4a,.

Email:jpy_KgG10KHq@outlook.com

2021-03-17

At&t charging cradle w/adapter for hs crl81112 crl81212 crl82112 crl82212 k3.3 model: crl81112 crl81212 crl82112 cr.condor d7500 ac adapter 7.5vdc 500ma new 1.2x3.4x11mm 90 degree.toshiba g71c00060110 10v 2a replacement ac adapter,philips jaa-003060-u ac adapter 6vdc 0.5a used -(+) 0.9x3.4mm 90.dell adp-150bb series da-1 ac adapter 12v 12.5a power supply 3r1,sony vgn-ft50b 19.5v 4.7a 6.5 x 4.4mm genuine new ac adapter,ast adp45-as ac adapter 19vdc 45w power supply,asus pa3165e 19v 3.95a replacement ac adapter,.

Email:855_aWdfWs@yahoo.com

2021-03-14

New ault i.t.e. power supply sw202 5v 2a 24v 0.7a ma-00-00-f-02 ac adapter 4-pin,aerogarden replacement parts adapter model 6wwpc01 class 2 power supply brand: aerogarden type: ac adapter model: 6w,9v ac / dc power adapter for memorex itrek m3000 ipod portable speaker.toshiba sadp-230ab d 19v / 12.2a replacement ac adapter.umec up0351e-12p ac adapter +12vdc 3a 36w used -(+) 2.5x5.5mm ro,new orig cpu fan for acer sunon gb0507pgv1-a 13.v1.b2835.f.gn df.genuine adapter charger hp compaq notebook 6535b 6710b 6715b,.