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The Character of Future Conflicts

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Partial Report 2

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Framtida konflikters karaktär

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The Character of Future Conflicts, Partial Report 2

Abstract (not more than 200 words)

Economic interests are of great significance in the emergence of armed conflict and play a central role in the development of corruption and in the growth of rule-breaking sub-cultures and their infrastructures. Such infrastructures are used for, among other things, smuggling, money laundering and counterfeiting. They are also used by terrorist organisations and could be used by states for carrying out anonymous assaults on other states. There is thus every reason for non-corrupt states to collaborate via a security regime, which does not address military and enforcement issues independently and in geographic isolation.

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Sammanfattning (högst 200 ord)

Ekonomiska intressen har stor betydelse för uppkomsten av väpnade konflikter och en central roll för framväxten av såväl korruption som regelbrytande subkulturer med infrastrukturer för bland annat smuggling, penningtvätt och förfalskning av dokument. Dessa infrastrukturer utnyttjas av terrorister och kan även utnyttjas av stater som vill genomföra anonyma angrepp. Mot den bakgrunden finns det skäl för icke-korrupta stater att samarbeta i ett säkerhetsorgan som inte betraktar militära och polisiära frågor var för sig och geografiskt avgränsat.

Nyckelord

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Abstract

Economic interests are of great significance in the emergence of armed conflict and play a central role in the development of corruption and in the growth of rule-breaking sub-cultures and their infrastructures. Such infrastructures are used for, among other things, smuggling, money laundering and counterfeiting. They are also used by terrorist organisations and could be used by states for carrying out anonymous assaults on other states. There is thus every reason for non-corrupt states to collaborate via a security regime, which does not address military and enforcement issues independently and in geographic isolation.

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1. Introduction

1.1 Background and objective

The project, "The Character of Future Conflicts", was initiated in the spring/early summer, 2000, by the Division of Defence Analysis, which is part of the Swedish Defence Research Agency. The intention was to increase the general understanding of conflicts. The first partial report was published in December 2000.[1]

The project highlights the link between the flow of funds and the use of violence, as well as the extent to which different cognitive models influence the interpretation of armed conflicts, whether consciously or unconsciously. Technical concepts are also developed in an attempt to broaden the way of thinking surrounding the character of future conflicts and possible forms of prevention.

In 2001 the project was conducted by Folke Andersson, Elisabeth André Turlind (project leader), Eric Sjöberg (main author) and Åke Wiss. To a certain extent this report has been facilitated by co-operating with the project, "Command and Control in Future Warfare".

1.2 Basis and method

In order to avoid being caught up in a too narrow model of reality, the project group was inter-disciplinary in character. The range of subject areas embraced sociology, technology, history and economics. The report has been based on text and Internet searches, private conversations and symposiums.

As a part of our work an international two-day symposium was held on 15-16 October 2001, and it was opened by round-table discussions. Papers presented at the international symposium have been published in a separate report.[2]

[1] André Turlind, E. et al (2000)
[2] André Turlind, E. (2001)

2. Conceptions and Reality Models

2.1 Conceptions following 11 September

In our previous report, we made the assertion that the security of economically developed states can, to a lesser extent than in the past, rely on traditional military defence. This conclusion applies even after the attacks against the World Trade Center and the Pentagon on 11 September 2001. These attacks conformed on several points to our anticipations of the character of future conflicts, namely that the:

- threats come primarily from actors capable of operating globally or alternatively co-operating with or gaining support from transnational networks
- attacks, to a large and probably increasing extent, can come from within the societies under attack
- attacks are carried out anonymously and can be based on moral asymmetry and civil technology

Naturally enough, the attacks on 11 September were followed by extensive speculation and analyses concerning which actors were responsible, as well as how and why the attacks were carried out. For example, the conceptions that circulated rapidly were that only an organisation having ample resources could be behind the attacks, that the attacks required sophisticated co-ordination and that the pilots must have been highly skilled. None of these were true.

The attacks seem to have been carried out by 19 people, having a budget that fell short of one million US dollars. Only limited co-ordination was required, and the skill of the pilots was considered to be mediocre when they underwent flight training in the USA. There can be several explanations as to why false conceptions arose and became so widespread. For example, it is plausible to assume that powerful forces must lie behind significant incidents. This type of reality model is more likely to appeal than the alternative, i.e. that a small organisation, with inept individuals, can achieve considerable devastation.

The fact that reality models form the basis for the way in which incidents are interpreted, is well known but sometimes overlooked. As the examples suggest, conceptions probably arise spontaneously out of the prevailing reality models. They can also be channelled and modified through strong leadership. This is of considerable significance since the conceptions in society are important for its unity, and set limits for those measures that are politically viable and appropriate. President Bush's speech, in which hostility towards foreigners was branded as un-American, constitutes an example of how a conception, having a unifying effect, could suppress other conceptions which were about to create division among different groups of the population.

The attacks not only brought to the fore the question of how conceptions are formed but also which reality models are used when analysing conflicts and planning countermeasures. In this context, results from sociological research can contribute significantly.

2.2 The account as reality model

The sociologist Charles Tilly has written an essay in which he asserts that trained researchers as well as people in general have a tendency to describe social processes in narrative form, i.e. like accounts.[3] These accounts often have a characteristic structure, which he refers to as "standard story". This structure, which we regard as a reality model, implies that events and prevailing conditions within a society are direct consequences of conscious acts committed by a limited number of independent actors on particular occasions.

The interesting point is that this reality model, which frequently forms the basis for how the media describes conflicts, very often misses the central causal connections behind social phenomena. An explanation as to why the model nevertheless has become entirely dominant can be the fact that its form is easy to communicate and thus easy to spread. Widespread circulation increases the probability that repetition reinforces the model, as well as the conceptions conveyed by the model. The model of reality can then be conceived of as synonymous with reality.

It is appropriate to mention that there are alternative, non-narrative models of social processes, including conflicts, which capture the central causal connections well.[4] Such models can take the form of computer-based simulations. These simulations have illustrated how social structures and group behaviour can develop out of an interaction between individuals who follow a few simple rules regarding their behaviour towards each other and their surroundings.[5] An interesting phenomenon, observable in these simulations, is the development of structural deadlock, for example cultural conformity.

In a project aiming at increasing the general understanding of conflict dynamics, working with both models is necessary. This is because information concerning conflicts around the world, as a rule, reaches us via organisations that do not systematically question the narrative model. Our understanding can therefore benefit if the information undergoes a subsequent analysis supplemented by non-narrative models in order to ascertain the central causal connections in a conflict. There are, however, examples where the narrative model in itself captures the central causal connections. The conflict between China and India in 1962 is a case in point.[6]

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[3] Tilly, C. (1997)
[4] Epstein, J. M., Steinbruner, J. D. & Parker, M. T. (2001)
[5] Epstein, J. M. & Axtell, R. L. (1996)
[6] Kalkat, A. S. (2001)

3. Examples of Conflicts and Threats against Society

3.1 Deliberately chosen confrontation

The conflict between China and India in 1962 can be described as a border conflict. Having taken control of Tibet in 1950, Chinese troops crossed the MacMohan Line, the border established in 1914 between British India and Tibet. They laid claim to the Indian Aksai Chin Plateau and in 1956-57 secretly built a strategic link between Tibet and Sinkiang. This caused the Indians to react and armed conflict broke out in 1962. This version of the sequence of events is based on the conception that India held the right to the Aksai Chin Plateau and that it was thus China that carried out an armed occupation of parts of India.

There is however another version, advocated by the Chinese government. According to this conception, the MacMohan Line is illegal and thus the Aksai Chin is a part of China. As the Chinese troops were on Chinese territory, the Indian action against the Chinese troops in 1962 constituted an attack on China.[7] Thus far, the conflict centres on who has the right to Aksai Chin and which of the two conceptions should take precedence. The conflict can be about more than just the control of territory, and an account should provide an explanation of the motive behind the attack from either side. This requires further analysis. The choice of conception forming the basis of the analysis is of considerable significance.

The conception that China acted offensively poses the question concerning the motives behind a Chinese attack. Given that the occupied area is economically and politically insignificant and difficult to access, the explanation must be sought elsewhere. A more plausible explanation is that the occupation can be viewed as a demonstration of power, addressed to all of the countries in the region, from a state that intends to be seen as the regional super power.[8] Super power status carries with it considerable influence over the rules governing the economy in the region, which would favour the long-term economic development of China.

3.2 Miscalculating egotism

To a certain extent the conflict in Sri Lanka complies with the narrative model. By means of its absolute majority in Parliament, representatives of the significantly largest ethnic group in the country were able to push through amendments to the constitution that favoured its own ethnic group. These sudden changes in the rules of the game in society resulted in the marginalisation of minority groups, not least of all financially. This was achieved by, amongst other things, changing the official language from English to Sinhalese, the language of the majority group. Thus, the minority groups, not least of all the Tamil, were excluded from higher education and employment within the public sector. In addition, land reforms were carried out, forcing Tamils from their homes. Thus far it is a question of a limited number of

[7] Calcutta Online (1998)
[8] Kalkat, A. S. (2001)

independent actors being responsible for a number of conscious, if not far-sighted, decisions and actions. Subsequent events could possibly be seen as direct consequences of these actions, even if they could not be predicted.

When the Tamil minority became increasingly marginalised, the most frustrated individuals chose to organise themselves into more or less militant groups, and made demands for the formation of a separate Tamil state. The Tamil's demands were met with military means and civil war broke out in 1983, furthering a radicalisation of the Tamil movement. The conflict still persists. This aspect of the conflict, the development of militant groups becoming increasingly more radical, constitutes an example of the type of process which can be analysed and simulated using non-narrative models.[9]

3.3 The art of survival without scruples

In the two previous examples the armed conflicts were initiated, intentionally or unintentionally, by strong governments, wishing to favour their own country or segment of the population, respectively. Armed conflicts can also arise when a previously strong government is weakened, not least of all economically. In these conflicts it is sometimes the political elite or elements of the government's armed authorities that endeavour to ensure that their own financial interests benefit.

A phenomenon not entirely unusual in economically weakened states is that government employees experience weakened purchasing power. This situation give those affected the incentive to find a subsidiary source of income. Subsidiary sources of income can be obtained privately as well as in a professional capacity, via the governmental organisation in question. In the latter case it is natural that the organisation receives income by providing services which are connected to its normal field of operations. If its normal field of operations includes exercising violence, it is apt that the subsidiary source of income will also be based on this capacity.

Information exists indicating that units within the Russian State's armed organisations found themselves in armed conflict with each other. In these cases, at least one of the parties was involved in so-called protection activities as a source of income. Over the course of time this income had become more substantial than the salary paid by the state. In situations where two state-armed organisations have had a conflict of interests involving a source of income, the role of state representative has been subordinated to that of free entrepreneur.[10] This simple example illustrates the importance that the flow of funds has to the government's ability, in practice, to control its own organisations; organisations which, at least officially, are controlled by the state. When an organisation can no longer be controlled by the state, it can undergo an evolution that increases its financial viability in the environment within which it operates. This evolution can lead to a situation where the organisation constitutes a threat towards the state or an obstacle within it. When viability is obtained by means of corruption, very serious threats can develop. This is illustrated below by the example of Ciudad del Este.

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[9] Epstein, J. M., Steinbruner, J. D. & Parker, M. T. (2001)
[10] Knoph, J. (2001)

3.4 The Ciudad del Este example

Ciudad del Este is a town in Paraguay, situated near the borders of Argentina and Brazil. During the 1950's, with the approval of President Stroessner, this town developed into a financial haven and a regional centre for smuggling. The most plausible reason for accepting, and even encouraging, such a development was that it stimulated the local economy and at the same time benefited the financial interests of the President and his cronies. Business developed so intensely that, during the 1990's, Ciudad del Este was ranked as the world's third largest centre of trade and commerce, measured in terms of the volume of financial transactions. It reached a peak in 1994, when turnover amounted to 12 billion US dollars. Rapid economic growth attracted businessmen primarily from Lebanon and Taiwan.[11] Today these groups are strongly represented in the area.

Initially, Ciudad del Este's status as a duty-free zone, surrounded by countries with high duties, made it an attractive centre for the import of legal goods and pirated products from neighbouring countries, as well as from Asia. The goods were then smuggled from Ciudad del Este to surrounding countries, in order to avoid duties. Some of the profits from smuggling were used to bribe customs officials and other civil servants. Thus, the state institutions were gradually weakened and a criminal infrastructure emerged which became increasingly more efficient at supporting smuggling operations and effecting money laundering activities. Once established, this infrastructure was also suited to more serious, illegal products. Regional producers of narcotics took advantage of the emerging infrastructure in order to smuggle their products and launder the profits.[12] These activities encouraged the further spread of corruption.

During the 1990's smuggling of legally produced consumer goods became less and less attractive as a consequence of reduced duties and attempts at tightening controls in neighbouring countries.[13] Reduced profitability has been the incentive for the operators in the Ciudad del Este network to find more lucrative enterprises such as smuggling weapons and people, as well as refining drugs. Making pirate-copies of records, videos and computer software is a rather new business area with considerable potential. High profit margins are a distinguishing characteristic of the business and it is sometimes organised along the lines adopted by South American drug cartels.[14] The capacity to earn substantial sums of money and the absence of a working legal system has attracted criminal entrepreneurs from other parts of the world to Ciudad del Este.[15] Particularly during the 1990's, in conjunction with the shift in Paraguayan government from dictatorship to democracy, numerous transnational criminal organisations seized the opportunity to break into this strategically located market.[16]

Since numerous transnational criminal organisations established themselves in the same area, Ciudad del Este became yet another marketplace where they could make

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[11] Rotella, S. (1998)
[12] U.S. Department of State (1997)
[13] Ritterband, C. E. (1998)
[14] Iwata, E. (2001)
[15] Sweeney, J. (2001)
[16] Rotella, S. (1998)

contacts, further strengthening the criminal infrastructure.[17] Apart from the existence of deeply rooted corruption, there are today facilities and organisations for the global transportation of goods and for various services, including money laundering and forging of identity papers and other documents. There is also easy access to a range of manufacturing resources. Consequently, Ciudad del Este has become interesting to terrorist organisations.[18]

3.5 A nest for terrorists

During recent years it has become increasingly more obvious that Ciudad del Este constitutes a haven for members of militant Islamic organisations, especially Hizbollah. Numerous factors combine to render the area attractive to members of these organisations. The fact that the area provides opportunities for gathering substantial revenues is an important factor. Here terrorist networks can deal undisturbed in a business that would not be tolerated elsewhere; for example widespread production of pirated goods.[19] Another factor that makes the area particularly attractive for Hizbollah, which has roots in Lebanon, is the presence of a Diaspora of numerous Lebanese businessmen. This Diaspora not only provides an additional source of income, by means of extortion, but also makes it easier for the terrorists to blend into the social and financial network.[20] Like the criminal networks, the terrorists exploit what appear to be legitimate companies as façades for their activities.[21] A third factor making the area appealing is the existence of a criminal infrastructure, which, amongst other things, facilitates access to weapons and false identification documents as well as contacts and complementary expertise.

By making good use of Ciudad del Este's special attributes, Hizbollah has acquired a source of income as well as resources that facilitate the execution of acts of terror. One can only speculate on how the income is used. It is likely that a significant amount is used to finance, amongst other things, mosques, schools and healthcare. By financing different social institutions, organisations such as Hizbollah and Hamas gradually gain increased support from and influence over the groups of the population that have been marginalised by the responsible government.[22] Such support increases the organisations' ability to recruit new members and the prospects of finding not only safe havens but also new areas from which to run businesses. At this stage it can be difficult to put a stop to an economic and social dynamics which can easily escalate to armed conflict.

[17] Rogers, A. (1998)
[18] Rotella, S. (1998)
[19] Whitbeck, H. & Arneson, I. (2001)
[20] Rotella, S. (1998)
[21] Whitbeck, H. & Arneson, I. (2001)
[22] Jönsson, P. (2001)

4. A Checklist for Survival

4.1 Foresight

After examining different types of conflicts and actors, the questions arise - what measures can prevent the emergence of violent actors, and how can the damage be limited in the case of different types of attacks? The most important measure is probably allowing scope for foresight. With foresight, a state would avoid creating conditions or rules, which, intentionally or unintentionally, marginalise a group of the population. It might be worth considering why neo-Nazis very often are young men with a lack of success in an ordinary social context.

Using foresight, a state would also be able to avoid creating rules that favour the emergence of actors who might pose a threat to society. The Ciudad del Este example illustrates the importance of the rules. It is also common knowledge that the ban on the sale of alcohol in the USA between 1920 and 1933 created business opportunities that laid the foundations for organised crime. A more recent example in Sweden, albeit on a smaller scale, is the increased tax on tobacco, which stimulated the emergence of an infrastructure for smuggling. Once established, this infrastructure can facilitate the smuggling of other goods.

4.2 Awareness

The social, economic, institutional, legal and technological environment, as well as sanction and subsidy schemes, give certain organisations and groups a distinct advantage over others. Being aware of these processes is a prerequisite for the early discovery of ominous patterns indicating the emergence of rule-breaking sub-cultures. Upon detection of such patterns, and in order to prevent them from developing further, the environment should be modified. Awareness must be exercised at transnational, national and local levels. For example, do the social, economic and legal rules work together in a way that counteracts corruption and the perversion of the course of justice?

4.3 Flourishing civilised islands

The type of armed conflicts, seen repeatedly in failed or failing states, is described by Mary Kaldor as the social relationships arising when the conventional economy breaks down. She also contends that diplomatic negotiations, based upon top-down conceptions, are incapable of considering the underlying social connections, and thus treat the different parties as if they were proto-states.[23] The conflict areas can serve as lawless havens for international terrorism, which is one of several reasons for taking measures that support the re-emergence of a well-functioning society. Kaldor advocates efforts that support or create civilised islands, which, by virtue of their economic viability can grow increasingly larger and eventually displace the

[23] Kaldor, M. (1999)

lawless havens completely. This concept has much to gain from developments that enable the construction of scaleable and robust technical infrastructures.

4.4 Full utilisation of civil resources

A robust and scaleable technical infrastructure would certainly help to make our own society less vulnerable to certain forms of attack, as well as to unintentional disturbances. Unfortunately, sections of the population can be the target in an attack. In our earlier report we illustrated how ruthless organisations can make use of civil technology. The notion of utilising civil equipment as a means of attack is advocated in the document, "Unrestricted Warfare", which was written by two Chinese colonels.[24] This way of thinking was fully exploited in the attacks against the World Trade Center and the Pentagon.

In this report we would like to demonstrate that the reverse could also be possible, i.e. with minor modifications, accessible civil resources can provide society with protection. The full utilisation of existing resources increases the ability to face unannounced attacks as well as a broader spectrum of attacks and other disturbances. One concept, which is presented in Appendix 1, transforms every car into an immediately accessible refuge following accidents or attacks involving chemicals, radiac or biological hazards or long term power cuts. When the alarm is raised or the lights go out, rescue is close to hand in the form of the car, which is used everyday.

4.5 Selective use of arms

Sometimes the above measures, based on non-violence, will fail. The reasons can be both numerous and controversial. When the use of weapons is called for, there can thus be strong grounds for carrying out the operation using the minimum of violence. With this objective in mind, we developed the concept of a special unit, called Pater Noster.

Pater Noster, which is presented in Appendix 2, is based on the technology described in this project's previous report but then the technology was used to make up essential components in weapon systems of ruthless organisations. Pater Noster is a unit with an offensive capability, targeting carefully selected individuals who live in enclaves that constitute havens for terrorists, criminals and war criminals. These enclaves can be so heavily protected that the police are unable to gain entry, whilst too little significance is attached to the problem to warrant sending in troops. Pater Noster was developed in order to eliminate this gap in operational capability. Pater Noster can also be used to destroy targets in a state's technical infrastructure.

[24] Qiao Liang & Wang Xiangsui (1999)

5. Conclusions

Economic interests are of great significance in the emergence of armed conflict and play a central role in the development of corruption and in the growth of rule-breaking sub-cultures and their infrastructures. Such infrastructures are used for, among other things, smuggling, money laundering and counterfeiting. They are also used by terrorist organisations and could be used by states for carrying out anonymous assaults on other states. There is thus every reason for non-corrupt states to collaborate via a security regime, which does not address military and enforcement issues independently and in geographic isolation.

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Appendix 1: FITCARE – Immediately Accessible Protection

Attacks without forewarning

When the public protection available in Sweden today was devised it was presupposed that an armed attack would be preceded by events that provide forewarning and thus time to increase preparedness. After the attacks on the World Trade Center this supposition appears out-of-date, and confidence in means of protection lying outside the direct control of the individual has perhaps been eroded. Henceforth, attacks without forewarning can prove to be the dominating method of choice, irrespective of whether the attacker is a state or non-state actor. One reason why states might choose to refrain from using traditional, open forms of attack is the very high risk of retaliation.

The public protection of the future should obviate the need for forewarning. This change would not only render the handling of future threats more effective, but also improve the usefulness of public protection in a number of situations where an antagonist is not involved, e.g. accidents involving the dispersal of hazardous substances. It is of course highly advantageous if the safeguards developed not only protect the population in the narrow sense of the word but also guarantee essential functions within society, such as the supply of electricity.

The motor car as an obvious refuge

The above reasoning leads to the conclusion that protection should be based on resources that are constantly accessible to a large number of the population. This precludes, for example, a scheme for distributing protective masks to the population in order to heighten preparedness. If and when an attack is carried out, it is highly unlikely that these masks will be easily accessible for anyone, with the exception of those most anxious individuals who always carry the masks with them. The creation of collective protection is a more interesting method when dealing with the threat of chemicals. One solution, which has been presented following the attacks on the World Trade Center, involves using offices and homes as a form of collective protection.[25] This is achieved by equipping the ventilation system with suitable filters, which are activated automatically, as soon as a detector registers the presence of biological or chemical weapons. The same method can also be used in underground train carriages, and act as a complement to protection against smoke caused by fire. Yet another possibility consists of equipping cars in the same way, thus transforming a fleet of cars into the central component in the civil defence.

When a fleet of cars constitutes the central component in the civil defence, the individual has considerable control. The car is often in the vicinity of its owner, rarely goes missing and undergoes regular checks, which could also cover protective equipment. Another advantage is that the protection provided by the car can be easily monitored and is entirely independent of external systems, apart from the provision of fuel. It is more difficult for the man in the street to check that the

[25] Newsweek (2001)

protection provided at work or in a large block of flats is not dependent on, for example, the electricity network. Confidence in the protection afforded by the car is therefore likely to be greater than that afforded by other forms of protection.

The benefit of turning the car into the obvious refuge and shelter-in-need is that this protection can be obtained with a minimum of investment in equipment, organisation and training. Using the car as a symbol for safety and a shelter requires hardly any training, since these routines fit in so well with every-day routines. As far as organisation is concerned, resources are primarily required for sanitising vehicles and surveying the situation as it arises, in addition to informing and directing the public. As regards equipment, the car already has many of the features required by a protection system.

The motor car – an almost complete protection system

Filters turn the car into a shelter offering collective protection
The car, as it is today, gives good protection against rainfall and wind, as well as cold weather. Certain models also include filters for eliminating pollen from the air entering the car. This concept could be developed further so that the ventilation system, which creates an overpressure inside the car, could be supplemented with a filter, which protects against radioactive dust and biological and chemical weapons. The filter can be activated by the press of a button or entirely automatically. Ventilation systems and filters should be dimensioned in order to cover the requirements of the maximum number of people that can be packed into the car. Using the car as a shelter, children can sit closely together with adults not wearing protective masks.

*Information technology (**IT**) in the car provides access to information and facilitates communication*
These days nearly all cars are equipped with a radio. Thus, those sitting in the car would be able to listen to news broadcasts and public information transmissions. For example, information can be supplied regarding areas to be evacuated, which roads should be avoided and where cars can be sanitised. A significant proportion of people carries cellular phones, giving the opportunity to establish contact with family or the authorities. In a not-so-distant future the mobile telephone can replace or complement the radio. Since every car has a generator, maintaining the power supply to the radio, the mobile telephones and the fan in the ventilation system is not a problem as long as there is fuel in the tank. By using the car, people are not dependent on emergency power units, which are rarely used and can require special training to operate.

*The **car** facilitates evacuation from a contaminated area and is easy to sanitise*
Based on the information received via the car's IT system, each driver can assume responsibility for evacuation from a contaminated area to a location where the car can be sanitised. The people in the car can wait there for sanitation resources to become available. The advantage of sitting in a mobile shelter is greatest when the contamination is localised.

***E**lectric cars using fuel cells might replace cars using the combustion engine*
Within the next few years a number of the large car manufacturers intend to launch cars using fuel cells instead of the combustion engine. Fuel cells convert the fuel into electricity, which is used to drive electric motors. These cars can, to a much greater extent than the cars of today, be used as small power units. Like small wind-driven power units and solar panels, they can be connected to the power grid and supplement the general supply. When this type of car constitutes only ten per cent of the total volume of cars, the amount of electricity generated collectively will be comparable to the combined production of all large-scale power plants. Thus, the car can contribute significantly to guaranteeing the electricity supply and the sustained operation in all systems dependent on electric power.

From idea to reality

The willingness to invest in protection against chemical weapons, power failures and other threats increases in conjunction with incidents that highlight society's vulnerability. The great demand for protective masks in New York, following the attacks against the World Trade Center, is a case in point. Investment in back-up power in California is another. In both cases it is worth noting that the sudden increase in demand created a market for products of inferior quality. It is also possible that those measures taken will do nothing to contribute towards long-term protection. In order to achieve long-term increased protection of high quality, regulatory measures may be necessary.

Regulatory measures can include legislating that cars be equipped in such a way that they can serve as the central component in the protection of society. Such a measure might founder on the basis that it constitutes a barrier to trade. Reduced tax for those cars capable of contributing to greater protection is an alternative. If neither of these measures is feasible, the state can at least assist by removing obstacles for private initiatives to increase protection.

A strong argument for the idea of the car being the central component in civil defence is the high rate of turnover. On average cars are replaced every ten years. If regulatory measures are taken and affect new production, protection of society and the population, as described above, can be achieved in less than twenty years. The cost will probably be moderate and ought to be seen in relation to defence expenditure for the same period.

Appendix 2: Pater Noster – Swarming Airborne Robot Warriors

War targeting the individual

Armed conflicts can assume many different forms. Over the last decade we have seen genocide in Rwanda, expulsion and massacres in Sierra Leone and former Yugoslavia, mass abductions in Colombia and the pursuit of harboured instigators of terrorism in Afghanistan. These events do not equate to the picture of military conflicts which was shaped by the Cold War, in which the military units of one state or a coalition of states fought against the military units of other states. The above examples lead us to think more of gang cultures and historical examples of how armed groups have grown so strong that they have been able to terrorise and dominate those around them.

By threatening the lives of the people immediately around them the armed gangs are able to force even unwilling people to join the group and participate in various forms of gang activities. Once part of the group, the members are subjected to severe group pressure and mutual checks. The more armed gangs there are and the stronger they become, the more dangerous it is to be an outsider. Those seeking to oppose the gangs run the greatest risk. International efforts could prioritise the arrest of this development with a minimum of force, in order to prevent excesses which violate basic human rights.

In acute situations the use of force can be the only remaining means of preventing the growth of the armed gangs and their acts of cruelty. An appropriate and reasonable objective can be to use force only against those individuals committing violations and to do this in direct connection to the violations. This signals to the remaining gang members that it is more dangerous to commit violations than to defy group pressure. This principle is particularly justified when the gangs have grown as a result of threats and coerced recruitment. Indiscriminate use of force, amounting to collective punishment, can produce the opposite effect, i.e. it can help to bond the gang members together against an exterior threat.

The "eye" and the "big stick" in the sky

The objective to use force solely against those committing violations, and doing this as an immediate response to violations, can be achieved only by keeping individuals under continuous surveillance. In an ideal system a watchful "eye" would constantly follow those individuals who have a high probability of committing violations. The mere presence of the watchful "eye" would perhaps act as a deterrent for certain individuals. When observation proves inadequate to prevent violations, a stronger deterrent would be employed. In an ideal system, the "eye", which would follow the individuals wherever they went, would be mounted on a barrel capable of firing bullets.

The technology required to build a system approaching the ideal is under development. An essential component in the system is the miniature coleopter.[26] The coleopter is an unmanned aerial vehicle (UAV), weighing just over one kg. It can take off, hover and land like a helicopter and also fly horizontally at a speed of 100 km/h for over an hour. A prototype has been flight-tested in strong winds and has performed excellently. Other important components are miniature cameras and systems for communication, navigation and control. The most spectacular component is perhaps the weapon developed by the Australian company, Metal Storm Limited.[27] The complete weapon consists of a barrel which is loaded with a number of electrically fired bullets. If this barrel is placed in the coleopter's centre axle, a system is created which can best be described as an observant, flying gun. This observant, flying gun is thought to be able to replace a soldier on the spot.

Weapons facilitating the emergence of agile swarms

There are good reasons why soldiers operate in groups and not as individuals. In the armed conflicts that arouse international attention, there are also good reasons for deploying many groups. The numbers are required in order to maintain both presence and readiness to act in many locations. Consequently, military operations are often about conveying thousands of soldiers to a greater or smaller target area. This transportation and presence is associated with numerous complications and risks.

If coleopters are used instead of soldiers, the risk for loss of human lives is reduced. The need for numbers remains, but instead of groups of soldiers, swarms of coleopters are used. Unlike the soldiers, the individual coleopters and those in swarms can be easily moved within the target area, even if the terrain is rough and mined. Unlike the soldiers they can also be transported to and maintained inside a remote target area, without the assistance of air or ground transport. Instead the coleopters are moved to the target area with the help of small, unmanned aerial vehicles of a type having extremely long range, for example an advanced version of Aerosonde. Aerosonde looks like a model aeroplane and weighs less than 15 kg. A few years ago a prototype flew across the Atlantic.[28] An advanced version of Aerosonde, called Seascan B, is expected to be capable of flying 5000 km carrying a 3.5 kg load.[29] A further development of the Seascan B, adapted to the Pater Noster-concept, has been conceived and we will call this the Seascan Transporter.

Pater Noster - an infrastructure for unmanned terrain dominance

In the Pater Noster-concept about one thousand Seascan Transporters are used in order to establish an airborne communication and transport infrastructure. The Seascan Transporters are lined up like a string of pearls between a command site and the target area. Each Seascan Transporter can exchange information with its neighbours by means of radio or laser links. Together they act as the nodes in a

[26] DARPA (2001)
[27] Metal Storm Limited (2001)
[28] The Insitu Group.com (2001)
[29] The Insitu Group.com (2001)

broadband capacity communications link, connecting the command site and the target area. These same Seascan Transporters also convey armed coleopters as well as fuel to the target area. The Seascan Transporters are equipped with reconnaissance sensors and remain as Combat Air Patrol over the area of operation for approximately six hours. The fuel is transferred to the coleopters by means of air-to-air refuelling. When the coleopters have fired their projectiles, they are recovered by Seascan Transporters and returned to base. In brief, this infrastructure means that no cargo planes, ships, ground vehicles or soldiers need to approach the target area.

Air-to-air refuelling allows several hundred free-flying coleopters to remain in the air, inside the target area, continuously and for an unlimited period of time. In order to utilise them efficiently, it is essential that a few individuals can control them. Some routine procedures, such as air-to-air refuelling and certain action reporting, can be automated.

During periods of considerable inactivity and where a certain amount of automation is possible, it is advantageous if a single individual can control an entire swarm of coleopters.[30] In this instance, existing methods of forming and controlling swarms and flocks can prove very useful.[31] In principle, an officer would be able to sit onboard a ship and lead an armed reconnaissance platoon. His platoon can consist of a swarm of sixteen coleopters, situated more than one thousand kilometres away. The officer can change focus - both by moving the swarm and by connecting himself to the various coleopters in the swarm - check the environment by means of the respective coleopter's sensors and allocate different tasks to the coleopters. The tasks could consist of following a particular individual or keeping a building under surveillance. By managing resources in this way, sixteen officers would be capable of manoeuvring a total of 256 coleopters.

Situations full of action might merit allocating an officer to each individual coleopter. For example, a team of sixteen officers could sit grouped together and, when necessary, take over the tactical management of a swarm. Using the swarm as a stand-off elite unit in this way would be impossible without the broadband capacity communications link, connecting control site and target area.

In order to use the Pater Noster unit 24-hours a day, week after week, several shifts of personnel are required. Apart from the officers controlling the coleopters, personnel would be required to take charge of the returning Seascan Transporters, re-equipping and re-dispatching them. In total between 200 and 250 people would be required in order to keep 256 coleopters continually in the air, over one or several target areas, at an estimated cost of between two hundred million and four hundred million US dollars per annum.

[30] Reynolds Engineering & Design (2001a)
[31] Reynolds Engineering & Design (2001b)