

November 2014

Global Flow Security Working Papers

Chapter 1

Global Flow Security: A Conceptual Framework

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1. Globalization And Flows

We are currently in the turbulent midst of what American futurist Alvin Toffler once referred to as the “Third Wave.” This post-industrial revolution is generating a paradigm shift of the human condition, with two deep consequences as a result. First, technology is shrinking the world, both ecologically and socially. Ecologically the world has for the first time become palpably finite and severely damaged in a number of ways. Social communications technology has shrunk the world into a global village, but a village in which deep socioeconomic tensions also generate violent revolutionary pressures. Second, and closely linked to the above, technology is making the human condition more fluid in every respect. The critical economic, technological and human flows on which our societies depend on are diffusing and spreading from within the boundaries of the state to the transnational global sphere beyond individual state control. These transnational “mega-flows” are now the vital life systems on which the well-being and survival of globalizing societies depend.

Emerging actors in the global arena

Transnational actors who direct or influence these flows are emerging as new power brokers alongside the traditional state. They do not have the broad range of power of leading states, but they are increasingly influential, and in some cases even dominant, in certain domains. These non-state actors can be grouped into three broad categories and six types:

First, two ‘alpha’ actors – transnational corporations and leading urban nodes. These actors need states and often share vital interests with them, but they operate beyond any single

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state's boundaries and increasingly function parallel to them. In addition, they are replacing the state as core economic, technological and scientific drivers. States can still dictate the rules of the road, but they are no longer in the economic and scientific driver's seat.

Second, civil society, morphing as two 'rainbow' actors – either as political clouds (voters where that is possible, or rioters where not) or as economic clouds (consumers). Both of these actors are empowered by the grass-roots mass communications that emerged for the first time with the dawn of the Internet.

Third, two 'black' actors – global organized crime and transnational revolutionary networks – with agendas actively threatening the interests of states and alpha actors. As a result, the center of political gravity is shifting from state structures to transnational flows.

Each of these three types of actors has a distinct impact on global flows. Together with nation-states they generate, shape and/or damage global flows in a variety of ways.

Methodological implications: When considering global flow security it is essential to keep these six non-state actors in mind in addition to the state. It is important to identify the particular role and influence each exerts and how they impact on global flows. Alpha cities and global organized crime tend especially to be overlooked, despite the fact that both exert considerable influence in specific ways. The particular importance of cities as leading emerging actors is crucial.

The place of flows

The importance of economic, technological and human flows is not a recent phenomenon, yet two aspects are new. First, these human flows for the first time now transcend the state on a significant scale, both in terms of volume and power. Second, global ecological flows are now for the first time critically affected by human activity.

Our dependence upon human-created flows is not new, but in the past their scale was far less significant. Local flows of people, goods and services were important for agricultural society, but critical flows were generally limited geographically. During the industrial age, the range of critical economic flows expanded, but the economic core activities on which industrial societies depended remained essentially national and confined within individual state boundaries. The name of the Westphalian game was to protect that what was inside the borders of the state, or to expand those borders, but transactions taking place beyond the borders were only of importance to the extent that they affected the interests of the state. They did not yet have an intrinsic value and power per se, and with few historical exceptions – such as the Hanseatic League – they were run by states and did not create a power base for independent non-state actors.

Similarly, the global ecosystem – which is a massively complex 'flow of flows' – has always been essential for our survival, but until about one hundred years ago it was largely unaffected by human activity. It was both self-sustaining and offered unlimited natural resources. Moreover, it was an infinite public good that humans could take for granted and exploit seemingly

limitlessly.

From borders to flows

Both of the flow conditions described above changed in the late industrial age, causing both new opportunities and challenges. On the one hand, the surge of post-industrial communications technology boosted flows exponentially:

First, the **scale** of “critical flows” on which advanced societies depend has increased massively, both in terms of geographic range, volume of transaction and multitude of flows.

Second, the **complexity** of critical flows – and especially the complex synergies between different flows – is multiplying.

Third, the **dependency** of the world’s societies – especially of the richest societies – on transnational global flows has increased massively.

The world’s leading actors – including all the major state powers – now depend critically on these functional flows that transcend the borders and control of individual states. This gives those leaders who are aware of this dependence and who prioritize it a powerful incentive to collaborate to promote these flows.

On the other hand, the global ecosystem came under increasing strain in the late industrial age. By the middle of the 20th century, technological power had multiplied the number of people inhabiting the planet, and multiplying their power to consume, pollute and manipulate their natural environment. As a result, today we find ourselves in a world with a finite global ecosystem characterized by severely damaged flows and whose condition is likely to continue to deteriorate markedly for the foreseeable future. Although it is highly uncertain how steep or fast the descent may be, even the most positive forecasts indicate that things will get very bad. Here it is important to emphasize, however, that this negative technological impact was largely the product of crude industrial-age technology. Today's post-industrial revolution is providing technology that offers vital solutions to the global ecological crisis. Our growing ecological crisis is thus largely a residual effect of the industrial era, whereas post-industrial technology represents one important part of the solution to the eco-crisis.

Methodological implications: How does the rise of flows impact on the way in which we traditionally have understood ‘international’ relations? Will transnational actors and flows supersede state and inter-state relations?

1.1.Two Fundamental Megaflow Systems

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When speaking of flow security we thus speak of two interacting but distinct types of global megafloes:

1. Global functional flows. The economic, social and technological flows created by humans and on which the most advanced, prosperous and powerful societies of the world depend. If these functional flows crash they will bring down with them both the political world order that has emerged since the end of the Cold War, and almost all human societies in the world, from the richest to the poorest. These functional flows can be divided into three interactive subcategories:

Global economic flows are now the lifeblood of all globalizing societies. Our dependence upon them is immediate, constant and considerable, and their importance is constantly increasing.

Global economic flows in turn rest on vast networks of **global technological flows** without which they would crash instantly. A mere slowdown of either of these two flows will have immediate and massive consequences for our societies, with potentially severe political consequences. The implications of a sudden breakdown of these would be immensely severe, with potentially existential consequences within days.

Global social flows of humans are both an essential part of our economic flows and a critical element in our political security. The challenge here is on the one hand to optimize the human flows needed for our functional requirements (e.g. human migration, information, etc.) while on the other hand controlling and filtering these same flows against various threats. Managing these human flows is our third major security priority.

2. Global ecological flows. The global ecosystem and the massive eco-services on which the functional flows depend. As these ecological flows deteriorate – which they certainly will do – they place the functional flows under increasing strain, which in turn will lead to increasingly violent stresses within societies and between leading global political actors. And if we reach a drastic ecological tipping point the entire human edifice of the anthropogenic age could crumble.

From a human functional perspective the global ecosystem can in turn be perceived in terms of providing two interacting basic functions:

Habitat. First, an ecosystem that is compatible with human biological needs (i.e. providing a favorable biotope for humans) is essential for the survival and comfort of humans. ‘Climate Change’ is the catchword for the challenge we face in this respect. And the increasing turbulence facing us – of which we have so far only seen the beginning – will severely strain our social, economic and technological flows.

Resources. Secondly, the ecosystem has historically provided us with a self-sustaining platform on which we have built our functional activities – from agriculture to mining to

settlements to transport. These foundations remain unchanged. What has changed, however, is that the global ecosystem is now for the first time in planetary history becoming critically depleted and disrupted by human activity. Under current trends this will have catastrophic consequences for both humans and the planet alike. It is therefore critical that humans now – as James Lovelock noted four decades ago – for the first time in history take active responsibility for sustaining global ecosystem flows on a large scale. This means that not only protecting, but also actually servicing, the global ecosystem is now becoming an increasingly urgent task for humanity.

The net result is that the significance of these transnational flows for human survival has grown to the point where **securing these global flows is emerging as the primary existential interest of all major globalizing actors, be they state or non-state**. This gives all major globalizing actors a powerful and concrete shared interest in non-zero sum cooperation to ensure these functional flows flourish.

Methodological implications: When analyzing flow security it is essential to keep this big picture in mind. First, to include all the critical dots (holistic perspective). Second, to place them correctly in terms of their relations with each other (structured perspective). Third, to keep in mind the ways in which they do or can interact (synergistic perspective). Fourth, to understand their order of priority (hierarchic perspective).

But yesterday's ghosts still haunt us

The nascent joint interest in collaborating to protect vital global commons, however, shares the stage with a competing and more divisive agenda. It is now clear that the visions of a liberal international world order envisioned two decades ago² were premature. Yesterday's Westphalian agenda of inter-state competitive power politics is not over. The world's major states remain the principal global actors, authoritarian regimes of varying degrees of ruthless brutality remain in power (including in states of global significance) and the potential for major violent conflicts among great power states is becoming more apparent.

At the same time, these same great powers all depend, to varying degrees, on their shared transnational functional and ecological flows for their survival. On the fringes of globalization, some of the more primitive major state regimes – such the Putin “conglomerate” running Russia – do not realize it entirely, while others, more deeply embedded in globalization – such as the Communist Party leadership of the People's Republic of China – are acutely aware of it. We thus currently have a tense overlap between yesterday's residual Westphalian zero-sum competition between state ‘islands’ and the nascent globalizing imperatives for non-zero sum cooperation to promote shared transnational flows.

As long as global flows function and major state actors not only benefit but also depend on them (and realize this dependence), there is a good chance that the trend towards increasing non-zero sum cooperation will continue. In this case the focus of security policy could shift from

² See, for example, Francis Fukuyama, *The End of History and the Last Man* (New York Avon Books, 1992).

protecting and promoting state sovereignty to protecting and promoting shared critical transnational flows transcending the boundaries of any single state or group of states. This would in turn entail a shift over time of the center of gravity from borders to cross-border flows. Under such conditions, power would gradually drain from the “Lords of Territory” to the “Lords of Flows,” in much the same way as the industrial revolution shifted power from the rural lords of arable land to the urban lords of industry.

We are not yet there, however. The relationship between yesterday’s and tomorrow’s security agendas is balanced on a very unstable tightrope. It can be toppled by a host of factors. Political instability within leading global states can shift policies, and functional flows can break down either from deliberate attack from revolutionary networks or hostile states, corrode from the ravages of organized crime, or collapse from simple mismanagement of flawed design. In fact, the only two genuinely existential threats that the world has faced since the end of the Cold War have been due to the last factor: the Y2K “Millennium bug” (e.g. flawed design) and the near financial meltdown of 2008-2009. Finally, ecological shocks (e.g. pandemic) or environmental stresses (e.g. scarcity and turbulence) will strain and could knock out our functional flows.

As we see from both of the two major global multilateral agendas – the Doha Round and the succession of global ecological summits – efforts to address the two main transnational challenges posed by the global economy and the global ecosystem face huge difficulties. This is compounded by growing multipolarity in the global system – as seen, for instance, in the recent diversification of the leading global state actors from the G7 to the G20. The agenda to protect and promote our global functional and ecological flows thus faces daunting challenges. Yet, it is crucial that we face up to the challenge.

Methodological implications: The tensions between the Westphalian ‘island’ agenda and the globalizing flow agenda are becoming crucial. What interests drive them, how do they interact, what sort of syntheses can emerge that affect global flows and what are their respective future prospects. Normatively, how can we promote a non-zero flow cooperation agenda over zero-sum power politics?

2. Flow Security

2.1. What Is A Flow?

Before we can assess global flows, we must first consider that all flows share three essential characteristics:

First, **all flows are circuits**. A flow is never linear, always cyclical. From a limited perspective it may appear linear as if one watches one single stretch of a river. However, the more one broadens and deepens the perspective the more the whole circuit becomes apparent. For instance, a river is merely part of a complex hydrological cycle involving condensation, rain, rivers, evaporation, clouds, rain again and so forth. A flow that is not circular dies.

Second, **all flows involve transformation**. That which flows, and the means of flow themselves, both evolve dynamically during the flow process. If the transformation is restricted, the flow suffers.

Third, **all flows are integral parts of other flows**, with complex synergies and multiple spinoffs interacting with other flows. Flows are always part of complex systems of complex systems. The more harmoniously a flow is integrated with its surrounding flows the more efficient, secure and cost-effective it is.

Understanding complex multidimensional synergies and managing these will be a second major security challenge in the 21st century.

Methodological implications: The above two factors mean that in coming decades we will increasingly have to take into account the full cyclical and multi-systems context of our critical flows. While specialized microscopic analysis remains important, it will mean very little unless it can be placed into context in the Big Picture. However, Big Picture analysis (or consilient analysis, to use Edward O. Wilson's term) with its unavoidable 'fuzziness' calls for a very different mind-set from that of traditional political science methodology. Moreover, specialized analysis of selected flows will have to be integrated with broader consilient analysis of the broader systems context.

Components of the flow circuit

A flow circuit consists of five distinct parts, all of which are essential:

First, **'the flower'**, or the object which is flowed. Examples of flowers are water or iron ore or a given manufactured product, humans, etc.

Second, **the streams**, or the medium or the context in which the flow takes place. These do not need to be physical channels – i.e. narrow and solid. For instance, the atmosphere in which evaporated water rises, or currents in a river are also media in which flows take place.

Third, **the nodes**, or, to be more precise, the transformation conditions under which the flower is transformed and shifts to a new stream, and in the case of human-created flows is directed and perhaps propelled onwards. Examples are factories, harbors, cities, etc.

Fourth, **propulsion**, moving the flower and the dynamics of the stream in which it moves - for instance gravity in the case of rain or liquid water, or an engine in the case of a boat.

Fifthly **a directing factor**, which keeps the flow coherent. In the case of natural or ecological flows this directing factor is multi-systemic, i.e. a decentralized and dispersed interaction of the entire system or systems. In the case of human-created flows the directing factor is far more limited, and generally centralized at some point, even if post-industrial technology allows for increasingly automated decentralized systemic flows at the

lower levels of the flow chain. Nevertheless the human directing factor is ultimately also influenced by several tangential systems outside its immediate parameters.

Methodological implications. Understanding these five components of the flow cycles individually and as they interact will become an increasingly vital requirement in coming years, creating a new high-technology market revolving around the integrated management of multiple systems. Of particular importance is the hitherto largely overlooked role of the nodes – especially the urban nodes.

What do flows need?

For flows to flow optimally, each of the above five component parts must interact harmoniously, creating a self-sustaining cycle of transformation of “the flower” with unending momentum. In addition the flow must be considered in its systemic context. Thus a flow that is inherently vigorous may have damaging spinoff effects that need to be taken into account. An example would be a river that floods its surroundings.

For human-created flows this requires four support functions:

First, **maintenance**. The flow must be kept running. This is essentially a logistical task involving servicing and repairs.

Second, **direction**. The flow must be directed to go where one wants it to go, and its volume and speed must be tuned so it neither overwhelms the system nor starves it. This is essentially a control function, involving all aspects of Command, Control, Communications and Intelligence (C3I). As post-industrial technology, especially nanotechnology, becomes more refined, the demand for products in this sector will increase enormously.

Third, **development**. The flow system may be improved for more optimal inherent performance with reduced spinoff effects. This is essentially a design task, involving science and holistic systems analysis.

Finally, **protection** against inherent breakdowns or damage from external factors. This involves both shielding against external threats and filtering against internal threats. This security requirement is increasing massively as the vulnerability of our societies to breakdowns in critical flows increases.

Additionally, one might add a fifth factor, which is likely to become increasingly important in future, namely integrating the flow with the surrounding environment so that it can operate as smoothly as possible and benefit as much as possible from its surroundings while damaging the surrounding flows as little as possible.

Generic threats to flows

From the above, it follows that there are three generic types of threats to flows:

First, '**rusting**', when lack of maintenance leads to failing channels and nodes with effects such as blockages, leaking, loss, degradation, contamination, etc. The source here can be either human insufficiency (e.g. incompetence, indifference, incapacity) or functional weaknesses (e.g. faulty engineering, weak components).

Second, **inherent systems failure**, when the flow system as a whole overheats or starves as a result of too much or too little flow. In human-created flows this is essentially a problem of basic design or C3I once in operation.

Third, **damage from an external factor** not part of the inherent flow cycle, such as a grain of sand in a clock, or a missile against an aircraft. Here the source can be either a deliberate hostile human intent or else a significant external event – ecological or social – tangentially disrupting the flow system.

In all cases, the absolutely most severe threats are those where one or more of the three security dimensions (social, functional and ecological – see section 1.3.) overlap. This increases both the intensity but also the complexity of the crisis, which makes it more difficult to deal with than when taking place in a single dimension. Crises in multiple overlapping security dimensions increase the danger exponentially.

Types of 'flowers'

The globalizing world involves three basic human generated flow security categories ('flow security concerns'):

Light - desirable flows (e.g. trade, investments, tourism, information)

Gray - swing flows. With potential for both good and bad impacts (e.g. migration, attitudes of civil society)

Dark - undesirable flows, directly damaging in various ways (e.g. crime, terrorism, anarchy).

Methodological implications: How to map these flows per se? How to map their interactions? Can we map the overlap between functional types of flows and flow security concerns? A critical security task will be to maintain and protect desirable flows at an optimal rate while filtering out undesirable flows. This is already done, for instance, in airports, harbors, etc., but now on a global and far more pervasive scale. What are the implications for freedom and integrity?

2.2. Threats To Flows Under Globalization

The three vital interests of globalizers in the post-Westphalian world

Physical threat is a function of the interaction of two factors: first, the essential subjective operational objectives of a given entity, generally termed vital interests; and second, the objective obstacles in the world around us that lie in the way of achieving those objectives. When these present an active danger to vital interests, they are generally termed a threat. In today's globalized world, the three generic threat dimensions outlined above translate into three primary vital interests and three distinct sources of threat.

Our most immediate and constant vital interest is our functional security – i.e. the critical life systems upon which globalized society depend. These are the transnational economic, technological and social flows on which we depend for our daily existence. These critical ‘transboundary arteries’ are the center of gravity of the globalizing world. If they were to collapse, human civilization would collapse almost instantly. Maintaining functional security is the core vital interest of “the globalizers.”

Our second vital interest is the political order on which the functional life systems of the globalizing world depend. These threats tend to grab news media headlines but are essentially a secondary danger, because, first, the political system is no longer the center of gravity, but rather serves as a buffer for the new functional center; and second, because the globalizers’ political order has more resilience and capacity to manage challenges than functional life systems. The political order can be stretched and battered far more than our functional base and we can still survive and work towards solutions. This is the second layer vital interest of the globalizers in terms of immediacy.

Our third vital interest is the harmonious functioning of the ecological system upon which we as humans depend and upon which our functional and political foundations depend. This is placed third because dangers to this dimension are emerging the most slowly, but they are also the most profound and basic. If this fails, then everything else fails. Safeguarding the global ecosystem is in humanity’s deepest vital interest. This is a third layer of vital interests in terms of immediacy, but at the same time also the most fundamental vital interest we have in the long term. The paradox is that while it does not yet manifest itself as overwhelmingly immediate existential threats today, it will do so in the long term. Yet unless we address it today, its long term momentum will become so great that we cannot redress it later.

Three essential sources of threat to “the globalizers”

As a corollary, sources of threat arise in three dimensions.

Political threats arise from conflicts between human beings, the 'dialectic of opposing wills using violent force to resolve their difference,' as André Beaufre expressed it.³ The

³ For details see André Beaufre as quoted by Julian Lider, in *Military Theory-Concept, Structure, Problems* (Gower Publishing Company Ltd., England, 1983), p.6.

key lever here is the will of the opposing party or parties. This threat dimension remains very much subject to the principles explored by Machiavelli and Clausewitz – i.e. the way humans react to the use of violence – even if the actors and tools have changed radically.

Functional threats arise from the malfunctioning of the critical life systems upon which a society depends. These problems are essentially internal -- malfunctions due to the breakdown of the system itself. In this case the lever is primarily technical and the solutions are essentially engineering ones.

Ecological threats result from our ecosystem. They can be either first-order threats, such as a Hurricane Katrina, or else the source of second-order problems, such as political friction generated by competition for scarce resources, refugee flows, etc.

This has two major implications. First, in the globalizing world the threats come at us from more directions. While our attention during the Modern Age came to be focused primarily on the political dimension – and during much of the Cold War on the even narrower military-technological sphere – we now need to broaden our perspective. This is because now all three dimensions can generate catastrophic existential threats.

Cutting-edge security analysis – and the security industries - must now broaden the threat perspective to include all three dimensions mentioned above. This is what we may call an holistic security perspective. The need for an holistic perspective holds true even if one continues to focus on a given part of the security spectrum and produce specialized products for that sector, for these products will have to be baked into larger systems and broader holistic strategies. Those who understand the holistic security environment and are prepared to develop holistic response strategies will be better able to provide the sort of solutions that will be needed.

Second, the three threat dimensions interact intimately, creating new complex synergistic threats. In all cases the most complex and severe threats arise when the three threat dimensions overlap. For instance, if hostile intent (e.g. political threat) results in deliberate attack against the functional base of an opponent requiring a complex combination of political and technical responses, which our existing stovepiped state structures have difficulty coping with. In the future, security policy will increasingly be based on synergistic threat analysis and response. This calls for a new synergistic capability on the part of all involved actors.

The flow security agenda

This means that the tomorrow's security agenda will increasingly focus on three major areas:

Ecological security. Protecting our ecological foundation, maintaining and reviving the global ecological flows.

Functional security. Protecting the functional foundations of the globalizers, ensuring that our technological and economic flows function and can evolve.

Political security. Protecting our ecological and functional foundations from human threats, whether they are driven by political, criminal or other motives.

Each of these three dimensions presents a challenge in its own right. On the one hand, in terms of the distinct basic nature and characteristics of each dimension, which will require a strategic approach adapted to the conditions in that dimension. On the other hand, in terms of the sheer volume of specific challenges within that dimension. These three dimensions will be the new focus of evolving security policies.

In addition, however, the three dimensions overlap and thus create complex synergies among these essentially different environments. This in turn generates a second major challenge, which is to pull together the strings of these three very different yarns and to understand how they interact, and especially to discern which radically new security consequences this can generate. This calls for a very general and broad epistemological approach coupled to a increased emphasis on systems analysis. We largely lost this broad type of approach during the Modern Age, when the essential focus was on increasingly narrow specialization.

There will be an increasing need for a new holistic and synergistic approach, capable of dealing with the interaction of complex systems. This 'consilient' approach, in the terms of Edward O. Wilson,⁴ is beginning to emerge in the business and the intelligence communities, notably in the United States.

2.3. A Flow Security Perspective

The above three dimensions (i.e. political, functional, and ecological) and their interaction leads to eight major areas of potential threat requiring more concerted security analysis. These eight areas, in turn, each encompass several specific security agendas within their own area.

Political Dimension

The political dimension includes two main areas, of which the second – external security - currently includes six key agendas.

1. Internal stability. The new challenges that globalization present to the domestic stability of the world's leading societies. This includes both the established elite states and the rapidly emerging transitional societies.

2. External security. This includes one traditional agenda and five new ones.

First, to develop a synergistic relationship between the state, as yesterday's established power centers, and the emerging new power centers around the transnational corporations (TNCs).

⁴ Edmund O. Wilson, *Consilience* (London. Little, Brown and Co, 1998).

Second, the need for the globalizing community - including the club of globalizing states, transnational corporations and other key non-state actors – to deepen their joint understanding of the new globalizing security environment, and develop a joint strategy for dealing with it under a unified leadership.

Third, to welcome the rapid transition economies (RTEs) into the world's elite state community, and integrate them among the stakeholders of globalization.

Fourth, to support those states and societies that are attempting to join economic globalization but that have varying degrees of difficulty in doing so. This is perhaps the most critical and urgent political security challenge that we face under current conditions. This is essentially an economic development challenge, but intimately linked to political and social developments over which we have very little influence.

Fifth, to manage those regimes that are alienated from or actively hostile to globalization. An extreme example is North Korea, but others include Iran, Venezuela and most significantly Russia. Where this challenge becomes acute it essentially calls for a traditional *Realpolitik* and power-political response, but now in increasingly asymmetric forms.

Sixth, the need to alleviate the misery of the world's poorest societies. Here the main danger is not - yet - one of confrontation but rather of implosion. This is essentially a problem of socio-economic development. While not as time-urgent as the fourth item listed above, it still presents the same dangers in the long run.

Functional Dimension

Security in this dimension essentially involves two basic objectives.

3. Protecting our global technological base. Ensuring that the intricate global technological networks and flows on which the globalizing economy and its societies depend continue to function. This is the deepest functional foundation on which the entire globalizing era rests.

4. Protecting our global economic base. Ensuring that the globalized transnational economy continues to thrive and evolve. This is the second deepest functional foundation on which the globalizing era rests. If this were to crash, then all else, including our political order, would crash.

Protecting this functional base constitutes the single most important foundation of the globalizers. If this crashes then everything else in the globalizing world would crash. We may suffer severe political setbacks and defeats, but provided our technological and economic globalization continues to thrive we can recover. This imperative has not yet received the political recognition it requires, but it will do so with a vengeance after our first serious global functional crisis. At this point if not before, the political will to deal with this challenge will emerge. Those business sectors that have made preparations to enter this sector will then be in an

extremely powerful position.

It is also important to note that the task of protecting our functional base will of necessity entail a very close cooperation between state and transnational corporate actors, since much of today's transnational functional activity on which the lead states depend is actually run -- and owned -- by such actors.

Ecological Dimension

The ecological dimension involves our basic natural environment on which we depend to survive and upon which our functional base rests. This applies both to our technological base (energy, communications, urbanization, etc.) and our economic base (raw materials, renewable resources) as well as our sheer ability to function biologically. Four major and closely interwoven threats have emerged in this domain.

5. Depletion. The depletion of vital non-renewable resources on which we depend. A possible example would be oil, though this is contested. More fundamental and severe is diminishing biodiversity, the consequences of which we are not even aware.

6. Degradation. The degradation of renewable resources, such as potable water, fish stocks (thirteen of the world's fifteen major oceanic fish spawning areas are currently overfished), arable land, regional flora and fauna, etc.

7. Disruption. The disruption of the global ecosystem, with consequences such as climate change, leading to a chain reaction from global warming to rising sea levels to increasingly extreme climatic conditions (increasingly severe heat waves alternating with extreme rainfall and flooding, stronger storms and hurricanes, etc.) to the potential reversal of oceanic conveyor belt currents, etc.

8. Unnatural Disaster. The potential for more extreme, widespread and devastating man-made ecological catastrophes. Chernobyl and other lesser industrial accidents (oil spills, poisonous spills, etc.) are examples. The most severe are probably to come in the form of potential biogenetic mistakes or the release (accidental or otherwise) of contagious diseases or other autonomously generating agents upsetting the eco-balance.

Conclusion

Protecting and supporting the three major flow dimensions and dealing with the eight key generic threats outlined above will be the core of our principal future security agenda. The future security nexus will have the following characteristics:

First, the center of gravity of our security will be the Functional Flows. As the Ecological crisis deepens these flows will gradually assume a parallel importance.

Second, our security response should ideally focus on managing the complex interaction between the three dimensions. This synergistic, consilient approach should ideally

dominate our security thinking, strategies, operations and tools. All of these will increasingly be baked into a broad multidimensional security network.

This, however, is an ideal situation. In practice the short-term security challenges and political imperatives facing major states will dominate, as we see from the ongoing trade and climate negotiations. How we can manage these pressing concerns while at the same time focusing on the existential structural and long-term issues is one of the big practical challenges we face. Nothing new here, but in our present circumstances the long term trends are so devastating that the issue is of existential importance.

The focus of further research needs to be on the more specific interaction between the Functional Dimension and the Political and Ecological Dimensions and the concrete threats this new synergy can generate. This can provide the basis for more focused studies of the sorts of synergistic response strategies, organizations and instruments that will emerge.

Our secondary security concern will be to protect the multitude of functional and social globalization flows that we depend upon and that are buffeted by the above three dimensions. This will provide a niche for more specialized flow defense strategies and products. However these will also need to be conceived of within the context of the broad threat environment and synergistic integrated responses.