

MARITIME GCI INITIAL INSIGHTS REPORT

**Risk Governance of the Maritime Global Critical
Infrastructure**

***An initial assessment of hazards in the Straits of Malacca and
Singapore and plans for future work***

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This 'initial insights report' provides a brief summary of the insights derived from an international multi-stakeholder workshop, the Risk Governance of Maritime Global Critical Infrastructures: Straits of Malacca and Singapore Exposed to Extreme Hazards, held in June 2009 in Kyoto, Japan. The workshop was the main activity in the first phase of a project jointly organised by Kyoto University (Japan) and the International Risk Governance Council (IRGC; based in Geneva, Switzerland). The presentations and policy dialogue that took place during the workshop provided the basis for the contents of this report. The result of this effort serves as a road-map for the next phase of the project, during which we plan to explore the project's next steps with current and future project partners and the workshop's participants.

This report refers both to the main points of discussion at the workshop and to the initial insights that the workshop developed, including issues that need to be further addressed in order for more detailed policy recommendations to be developed.

*This report starts with a **brief introduction to the project**, followed by the **initial insights** from its first phase, and the **roadmap** for the second phase. The original **Summary Report** of the June 2009 workshop is available as a separate document.*

1. Definitions and framing of the project

Global Critical Infrastructure

Critical infrastructures are the systems and networks responsible for the supply and distribution of the goods and services essential to the functioning of modern society. These include *inter alia* energy, transport, water, food, information and communication. As the world becomes ever more tightly interconnected, a globalised society dependent on global critical infrastructures has emerged.

Global critical infrastructures are essentially global public goods, the availability and functioning of which depend on the coordinated efforts of governments, business, local communities, international organisations, and many others. Despite the enormous reliance on global critical infrastructures, insufficient attention is given to the increasing dependency upon them to sustain livelihoods and economies. Extreme hazards, whether natural or man-made, have the potential to lead to global critical infrastructure breakdowns, with potentially devastating impacts on lives and livelihoods. There is therefore a practical and ethical imperative to manage and protect global critical infrastructures, as part of the overall protection of populations and the economy¹.

This project's main focus is on the maritime global critical infrastructure, using the Malacca Straits, the Port of Singapore and other major Asian ports and their hinterlands as an initial frame for analysis. We have made this choice, first, on the basis of the critical importance of these regions to the overall maritime global critical infrastructure and, secondly, because they allow us to take a focused approach to identifying governance issues and policy recommendations which may be applicable in a more global context and to other global critical infrastructures.

Risk governance

Risk governance is defined by IRGC as "the identification, framing, assessment, management and communication of risks in a broad context. It includes the totality of actors, rules, conventions, processes and mechanisms and is concerned with how

¹ See also IRGC, 2006.

relevant risk information is collected, analysed and communicated, and how and by whom management decisions are taken and implemented." [IRGC, 2009] IRGC's risk governance framework serves as an analytical tool for the project.

Risk governance of the maritime Global Critical Infrastructure – An overview of the situation in the Straits of Malacca and Singapore

The Straits of Malacca and the Port of Singapore constitute a key zone in the maritime global critical infrastructure. They make up one of the world's busiest and most congested shipping areas. Transported goods, including oil, are crucial to the economies of many countries. Furthermore, the Straits and major East Asian ports, including Singapore, lie in a hazard-prone and vulnerable region. Service disruptions in this zone could trigger cascading impacts through the global trade network and affect not only local coastal economies but also economies and societies elsewhere in the world.

The Straits of Malacca are 805km long. The Maritime Institute of Malaysia (MIMA) identifies six navigational choke-points as illustrated in Figure 1.

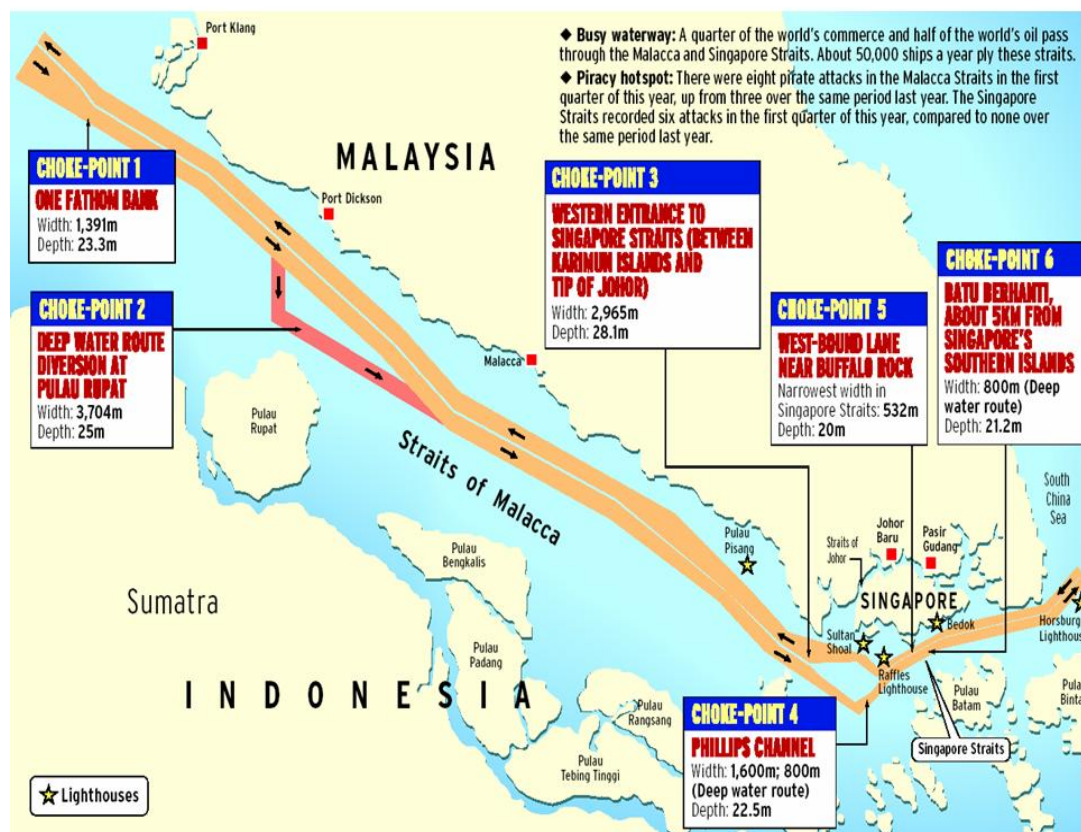


Figure 1: Possible choke-points identified in the Straits of Malacca and Singapore. [MIMA 2009], (Permission to reproduce obtained from Dr. H.M. Ibrahim of MIMA).

Other challenges that arise in the Straits include:

- **Safety and security enforcement and environmental protection.** Safety and environmental protection have been prominent concerns since the Torrey

Canyon accident off the South-West of England in 1967, which triggered the establishment of the International Convention on Civil Liability for Oil Pollution Damage (1969). These concerns led Indonesia, Malaysia and Singapore (“the Littoral States”), with the assistance of Japan, to form the Malacca Strait Council (MSC). In 2007, the Littoral States reached a milestone agreement towards creating better safety navigation, security and environmental protection in the Straits under a framework called the "Cooperative Mechanism." The mechanism facilitates cooperation among the Littoral States and the international maritime community through regular dialogue and also supports the funding and implementation of projects.

- **Piracy, armed robbery, terrorism and cyber attacks.** Pirates and armed robbers have a long history in the Straits [Gwin, 2007]. Slower and anchored ships, such as tugs and barges, gas carriers, and chemical and product tankers, as well as fishing vessels, are most at risk of attack [Bateman et al. 2006, 2007]. The widespread nature of this problem led to the creation of the Regional Cooperation Agreement on Combating Piracy and Armed Robbery against Ships in Asia (ReCAAP), which is the first government-to-government agreement that addresses this problem.
- **Haze from annual bush/forest fires.** Haze significantly reduces visibility in the Straits. It remains a problem, even though there is the ASEAN Regional Haze Action Plan 1997 and the ASEAN Fire Danger Rating System 1998, which acts as an early warning alert system. The ASEAN Agreement on Transboundary Haze Pollution was first introduced in 2002 but has not yet been signed by Indonesia.
- **The sustainability of the carrying capacity of the Straits is not yet addressed in any international agreements.**

While natural hazards – such as typhoons – are not of major concern in the Straits, extreme natural hazards affecting major ports in East Asia are of concern. Were an event such as a tsunami, earthquake or devastating typhoon to seriously disrupt operations in a critical hub-port such as Singapore, Shanghai, Kaohsiung or Busan, there would be cascading effects throughout the global maritime logistical network. These and other ports are also exposed to the various potential impacts of climate change as well as failures in other, linked, infrastructures (both globally, e.g., ICT, and within their particular hinterland, e.g., road or rail links).

A common factor found in case studies explored at the workshop was the absence of incentives for the key players to work seriously on the prevention of disasters or to mitigate their future impacts prior to their occurrence. Even when risks are recognised, the process of reaching a viable international agreement on the means to mitigate them can be very long. For example, it took about 30 years for the Littoral States to develop and reach agreement on the Cooperative Mechanism. This agreement represents the first ever successful establishment of cooperation for the management of an international strait as envisaged in Article 43 of the United Nations Convention on the Law of the Sea [IMO, 2007]. However, there are no current governance structures and processes that pertain to the identification, assessment and management of extreme natural and manmade events. Nor are there any that relate to interconnections with hinterland infrastructure.

The absence of such governance structures and processes raises crucial risk governance issues. To address them requires a long-term collaborative effort with the objectives of:

- Creating a strong collaborative network of stakeholders in maritime global critical infrastructures;
- Making specific resolutions locally in the community and institutionally in governments and international organisations to address identified risk governance problems of maritime global critical infrastructures; and
- Developing methods, tools and indicators for systematic monitoring, evaluation and archiving of success models, in order to adaptively improve risk-related policies and practices related to maritime global critical infrastructures.

2. Initial insights for the risk governance of maritime global critical infrastructures

The June 2009 workshop brought together multiple stakeholders and enabled a dialogue on managing risks and vulnerabilities related to maritime global critical infrastructures, using the Malacca Straits and Port of Singapore as a case example. The dialogue was structured in line with the IRGC's risk governance framework. Participants shared knowledge, experiences and lessons learned, and agreed to set up a global network of stakeholders to maintain the dialogue (see Appendix of Summary Report).

Insights from the workshop include the following:

- There is **insufficient creativity and imagination in the development of future problem-scenarios and, consequently, of viable solutions supported by adequate policies and institutions**. While there have been international efforts to promote cooperation in establishing and maintaining safety navigation aids and for environmental protection of international straits, participants were concerned that the focus of these efforts is too narrowly defined and does not consider extreme hazards and vulnerabilities that could affect the maritime global critical infrastructure in both the Straits and elsewhere.
- There is a **need to develop a common language**. Participants recognised that there is a common interest to protect the maritime global critical infrastructure but methods, models, and processes need a common communicative basis. Initial attempts to define key concepts were made at the first workshop; this needs to be developed further. The problem may be overcome with greater networking and outreach to bring stakeholders together.
- There are **knowledge gaps** regarding how to assess and manage risks and vulnerabilities in the maritime global critical infrastructure. These range from daily operational safety (e.g., navigational aids), natural hazards and security (e.g., insufficient contingency planning), to interdependency issues (e.g., between port and electric power infrastructures). The issue is further complicated by the need to manage information that could compromise the national security of the Littoral States or the Straits region as a whole (e.g., with regard to piracy or terrorism). There is a need for a conceptual framework to identify knowledge gaps and develop the tools to overcome them. The next phase of the project will set up sub-groups of interested parties to explore solutions to this problem.
- There is a need to **make decisions and take actions in a timely manner**. This is crucial for effective risk governance. Strategic cooperation among the different stakeholders is needed, in order to leverage each of their capabilities, but this should not be at the expense of timely action. Workshop participants, mostly from academic and research institutions, can play a key supportive role

in gathering and providing the information needed for the risk governance of the maritime global critical infrastructure.

- There is a **need for increased regional and international agreements and cooperation**. This will also be the focus of future project work, which will look at existing, relevant governance structures (e.g., international treaties and other trans-national agreements, codes and other mechanisms) as well as their application, funding and enforcement, before developing recommendations for what may be usefully and feasibly added to them. Factors pertaining to the sovereignty of, and economic and cultural differences between, the Littoral States will be considered, as well as the roles and responsibilities of user states, including financing mechanisms. The work will be extended to address the governance of risks associated with the interdependencies of hub-ports.
- To achieve the above, the next phase of the project needs to **involve a broader range of stakeholders with hands-on experience of the risks and issues in the risk governance of the maritime global critical infrastructure**, e.g., port operators, shipping industry, oil companies, governments of all littoral states, user states, intergovernmental organisations (e.g., ASEAN, Malacca Straits Council) and all relevant treaty organisations (e.g., IMO). The potential for achieving synergies from public-private partnerships must also be further explored.

3. Project Roadmap - Proposed plan for Phase II of the project

In consideration of the initial insights summarised above, participants at the first workshop, together with other interested parties, propose to take concrete steps towards developing recommendations for, and achieving, the effective risk governance of the maritime global critical infrastructure in Asia. These steps will proceed in advance of a second multi-stakeholder international workshop on risk governance of the maritime global critical infrastructure, to be held in late summer /early autumn 2010. It is intended that participants at this second workshop will be more representative of all key stakeholder groups (particularly governments, port authorities and industry) and that discussion is informed by substantial preparation, particularly in compiling available evidence and analysis to support policymaking.

The distinctions between the policy and research dimensions of the proposed work are shown in Figure 3, along with an interactive interface between them. An important goal is to strengthen this interface in order to create synergies among policymakers, practitioners and researchers, based on a common communicative platform or language. Using this platform, knowledge gaps will be addressed through collaborative projects with their purpose being to develop the strategically-timed decisions and actions that are required.

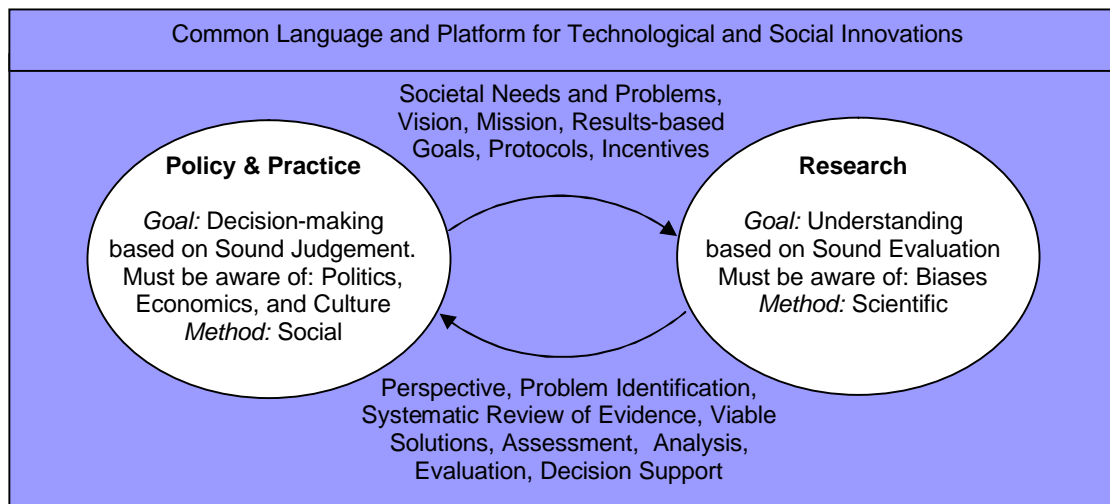


Figure 2: Policy and Research Interface

Step 1: Conduct one Regional Cluster (South-east Asia) one-day seminar to be held in late April 2010

(A second regional cluster one-day seminar (North-east Asia) is planned as an auxiliary meeting in late summer/early autumn 2010 to prepare for the next steps of the project.)

Participants from governments, infrastructure management agencies, academic institutions, research organisations and think-tanks, the total comprising a full spectrum of those involved in policymaking, management, research and innovation for the maritime global critical infrastructure, are invited to join a regional cluster. These clusters are opportunities to develop a common language among participants and to brainstorm ways to systematically address knowledge gaps.

South-east Asian Regional Cluster

Invitees: Participants from Malaysia, Indonesia, Singapore, Thailand and Japan.
Focus: Local concerns and global impacts of composite man-made hazards and threats in the Straits of Malacca and Singapore
Facets: Accidents/Collisions, Environmental Spills and Contamination, Piracy and Robbery, Fire (bunkers, refinery), Carrying Capacity, Hinterland Infrastructure, Navigational and Safety Aids, ICT (Marine Electronic Highway), Terrorism, Cyber Attacks, Social Capital, Smuggling, Land Bridge, etc.

North-east Asian Regional Cluster

Invitees: Participants from China, Korea, Taiwan, and Japan
Focus: Risks, vulnerabilities and impacts of disasters in the globally networked maritime global critical infrastructure, including ports, hinterland infrastructure, and local communities.
Facets: Natural disasters including earthquake, tsunami, typhoon, and other weather-related events compounded by climate change uncertainty, financial instruments to mitigate risk, insurance, data, societal, environmental, economic impacts, coping capacity, disaster prevention, reduction, management, planning, etc.

Table 1: Proposed Goals and Outcomes of Regional Cluster Meetings

	Goals	Outcomes
Develop a Common	Listen to the needs of policymakers and	- Number of policymakers and practitioners in the clusters.

Language	practitioners.	<ul style="list-style-type: none"> - Percentage of proposed actions related to needs of these participants. - Transpose needs into pre-assessment phase of the IRGC risk governance framework
Address Knowledge Gaps	Identify specific issues based on experiences and observations and frame problems with scenario development.	<ul style="list-style-type: none"> - Issues with the following documentation: (1) key decision makers, (2) anecdotal data from reputable sources, (3) important input variables and potential data sources, (4) outputs variables and desired ranges. - At least one imagined/modelled scenario to illustrate the specific problem to be addressed in proposed actions.
	Systematic review of available evidence.	An annotated bibliography which is contributed to by the participants.
	Identify data, information, knowledge needs.	From the documentation, extract input and output variables which are not yet available or accessible, then prioritise and categorise the challenges/means of acquiring them.
Strategic Timing of Decisions and Actions	Propose specific actions for Plan-Do-Check-Action (PDCA) spiral	<p>Small groups propose plans to achieve small, but significant, policy actions related to the risk governance of the maritime global critical infrastructure. A plan must satisfy the following criteria:</p> <ul style="list-style-type: none"> - feasibility (i.e. low-cost and available/accessible/obtainable resources) - visible impact - less than 1 year timeframe - local buy-in

The Plan-Do-Check-Action (PDCA) spiral, illustrated in Figure 4, is an adaptive management approach which starts with small, local, fast and low-cost initiatives on-the-ground [Okada, 2008]. The completion of a PDCA cycle leads, over time, to the gradual transitioning of successful community initiatives towards broader, institutional, steady and intensive adaptation of systems. Effective interplay between bottom-up and top-down influences leads to living, sustainable systems.

Using the concept of PDCA, clusters will start with a small, feasible and visible intervention and then grow to a larger scale, both in quality and coverage. This initiative needs to be very carefully and meticulously planned with all details respecting the on-the-ground realities of governing the maritime global critical infrastructure. The formulation of protocols for meaningful participation is a critical item of action at this stage of global critical infrastructure risk governance and will be a key output of this step.

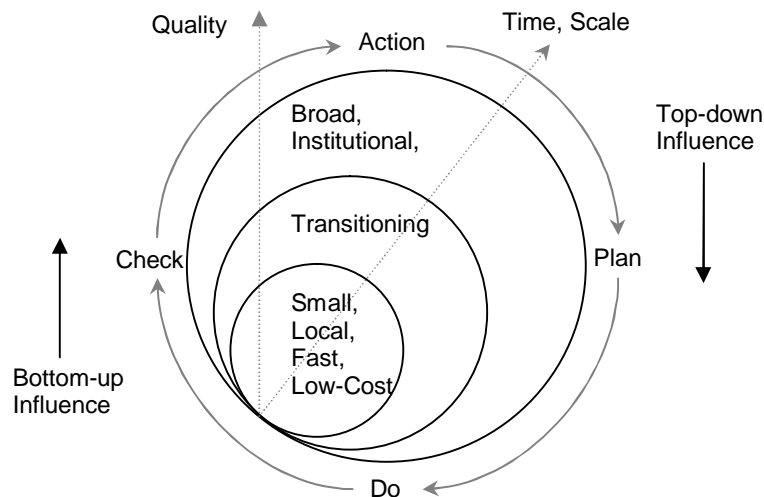


Figure 3: Plan-Do-Check-Action (PDCA) Approach

Step 2: Recruit participants from more stakeholder groups.

Particularly, from Indonesia and Thailand, as well as from the public and private sectors including infrastructure management agencies, shipping and logistics firms, risk finance, and ICT. Our goal is to attract more participation from stakeholder groups underrepresented in the first workshop (see Table 2).

Table 2: Goal for Stakeholder Representation of Second Workshop.

1st Workshop				Goals for 2nd Workshop			
By Country		By Sector		By Country		By Sector	
Japan	20 (51%)	Research (Academia, Industry and Think Tanks)	33 (85%)	Japan	25%	Research (Academia, Industry and Think Tanks)	40%
Korea	3 (8%)			Korea	10%		
China	3 (8%)			China	10%		
				Taiwan	5%		
Singapore	6 (15%)	Public Agencies (Regulator)	3 (8%)	Singapore	15%	Public Agencies	30%
Malaysia	1 (2%)			Malaysia	10%		
Indonesia	0 (0%)			Indonesia	10%		
				Thailand	5%		
India	2 (5%)	Private Sector	2 (5%)	India	5%	Private Sector	20%
Outside Asia	4 (10%)	NGO	1 (2%)	Outside Asia	5%	NGO	10%

If financial barriers hinder participation by key stakeholders, fundraising through collaborative grant applications will be pursued.

Step 3: Conduct second multi-stakeholder international workshop on the risk governance of the maritime global critical infrastructure in late summer/early autumn 2010

The previous three steps lead up to this event, which will bring stakeholders together to share knowledge, discuss integrated problems and needs, identify deficits in the risk governance of the maritime global critical infrastructure, and develop recommendations for overcoming those deficits. IRGC’s concept of *risk governance deficits* will be introduced in order to provide an analytical tool and help guide workshop discussions.

Prior to the second workshop the organisers will have gathered evidence on the state of risk governance of the maritime global critical infrastructure. Additionally, it will be possible to use the knowledge gathered at the first workshop as a baseline against which to determine progress achieved between June 2009 and the second workshop on developing a common language, filling in knowledge gaps and building the capacity to take strategic decisions and actions.

Step 4: Produce policy brief on the risk governance of the maritime global critical infrastructure by November 2010

The policy brief will contain recommendations for the improved risk governance of the maritime global critical infrastructure, with a focus on the Malacca Straits and the Port of Singapore. This IRGC publication will constitute the end of IRGC’s formal involvement in this project. For the network of stakeholders involved, however, the policy brief will be the starting point for the implementation of these policy recommendations.

Table 3: Timeline of Next Steps – Project phase II

2009	2010			
June	March	April/May	September	November
Held 1st multi-stakeholder workshop	Initial Insights Report	SE Asia and NE Asia Regional Cluster Meeting	2nd Workshop	Policy Brief

After completion of the project, the individuals and organisations involved are committed to building on the project outcome as follows:

Undertake proposed PDCAs from Step #1 within small, collaborative research teams. Multidisciplinary research teams will engage with policymakers, public authorities and the business sector in the development of simulations, assessments and analysis to support local, fast and low-cost results. Successful approaches will be scaled up into a larger multi-stakeholder research project to make a systematic diagnosis of the state of risk governance of the maritime global critical infrastructure.

Initiate concurrent collaborative policy dialogue on the risk governance of coupled global critical infrastructures, such as interconnected maritime / energy critical infrastructures, focusing on Singapore, or maritime and air transportation infrastructures, focusing on Mumbai, India, both as global megacity "hot spots". Because the actual test or usefulness of policies and practices in governing global critical infrastructures can be better evaluated in a local environment, a global megacity or 'hot spot' will be chosen as a case study. A broad five-year timeline of the proposed actions and their desired outcomes is summarised in Figure 5.

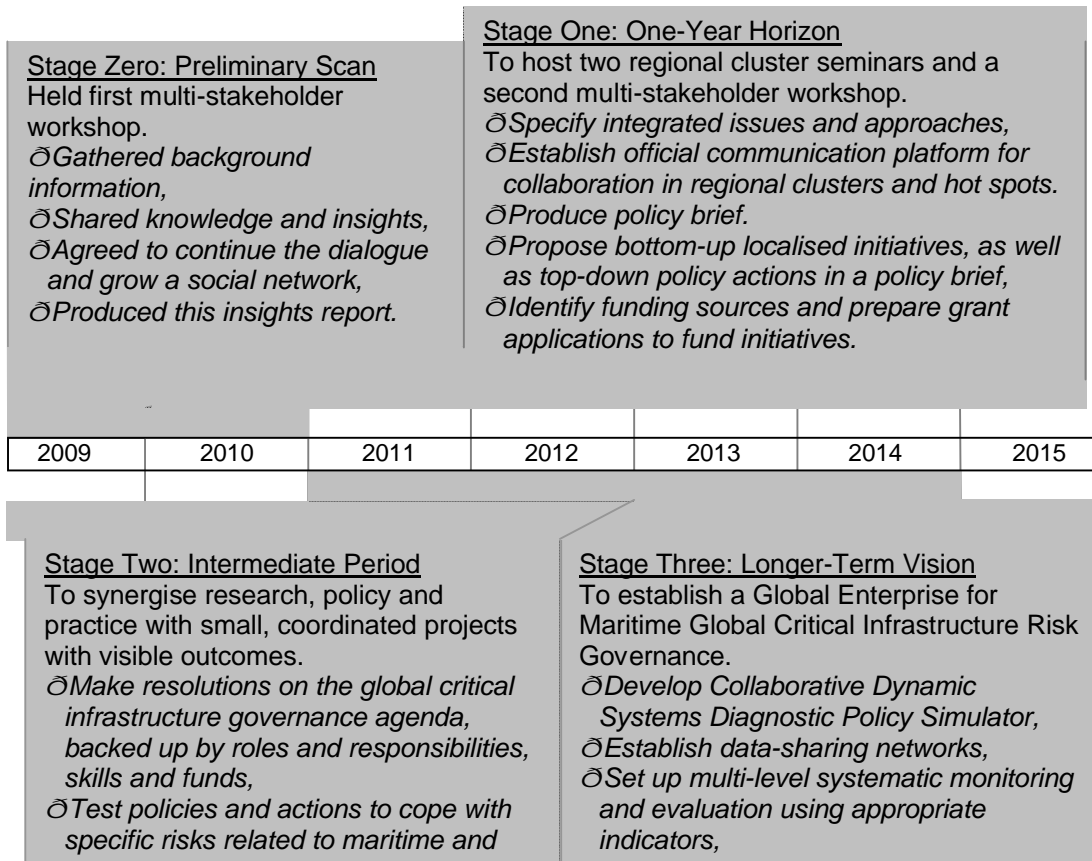


Figure 5: Long-term Timeline of Proposed Actions

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