SINTEF REPORT

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TITLE

i-Nord

A holistic information system for monitoring of maritime security, marine environment and marine resources of the Nordic Seas and Arctic Ocean

Pre-project
Executive summary

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ABSTRACT

The surveillance of the High North ocean areas.

KEYWORDS	ENGLISH	NORWEGIAN
GROUP 1	Information technology	Informasjonsteknologi
GROUP 2	Monitoring	Overvåkning
SELECTED BY AUTHOR	High North	Nordområdene

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Thank you,

Odd Kr. Ø. Pettersen
Project leader, *i-Nord* pre-project.

1 Introduction

The *i-Nord* pre-project is a product the Norwegian Government's High North Strategy[1]. The main objective of *i-Nord* is to implement and operate a ***comprehensive monitoring and information system*** of the High North Ocean areas, in order to directly address and maintain Norway's ***ambition of playing a leading role*** in the Nordic Seas and Arctic Ocean, including proper and sustainable management as well as proactive partnership in the intergovernmental Arctic collaboration.

The *i-Nord* pre-project is initiated and financed by the Norwegian Ministry of Foreign Affairs (UD) and the Ministry of Fisheries and Costal Affairs (FKD).

2 The pre-project mandate and objectives

The mandate for the *i-Nord* pre-project has been to prepare the best background and baseline for the Government's decision of starting the ambitious development of a full *i-Nord* surveillance system.

The specific objectives of the pre-project have been to:

- Identify the primary stakeholders to such a system
- Describe the *i-Nord* concept and overall system structure
- Describe best practice for developing such a system
- Identify the need for research and development
- Produce a main project plan
- Propose and coordinate a consortium with the necessary know-how and ambition to carry out the main project

3 Execution of the pre-project

3.1 Participants

To reach the ambitious goal of the *i-Nord* main project, a national team of relevant institutions and companies is required for developing the system. One main objective of the pre-project has been to gather the relevant institutions and expertise to discuss the aims and contents of an *i-Nord* system, and to provide and organise the inputs to the project deliverables in several reports and a demonstrator.

The institutions listed in Table 1 have been partners in the project.

[1] As of 2008-10-22: http://www.regjeringen.no/en/dep/ud/Documents/Reports-programmes-of-action-and-plans/Action-plans-and-programmes/2006/Strategy-for-the-High-North.html?id=448697

Table 1 Members of the project consortium

	Institution	Comments
1	Norwegian Meteorological Institute (met.no)	Activity leader
2	Nansen Environmental and Remote Sensing Center (NERSC)	
3	Norwegian Defence Research Establishment (FFI)	
4	Institute of Marine Research (IMR)	Activity leader
5	Norwegian Polar Institute (NPI)	
6	Norwegian Institute for Water Research (NIVA)	
7	Norwegian Institute for Air Research (NILU)	No financed contribution
8	Northern research Institute Tromsø (NORUT)	
9	University of Tromsø, Center for Remote Technology	
10	Norwegian University of Science and Technology (NTNU)	No financed contribution
11	University of Bergen, Geophysical Institute (UiB-GFI)	No financed contribution
12	Fugro OCEANOR AS	
13	Kongsberg gruppen (KOG)	
	• Kongsberg Satellite Services AS (KSAT)	
	• Kongsberg Spacetec AS (Spacetec)	
	• Kongsberg Defence & Aerospace AS (KDA)	
14	Saab company	No financed contribution
15	SINTEF	Project leader

3.2 Project activities

The following activities have been carried out:

- A0: Meetings.
  - Activity leader: SINTEF
    - status meetings with the clients
    - project meetings with the whole project group
    - meetings with stakeholders and possible users of the system.
- A1: User and stakeholder survey.
  - Activity leader: SINTEF
- A2: Description of system concepts, including demonstrator.
  - Activity leader: met.no
- A3: Base-line for main project.
  - Activity leader: IMR
- A4: Main project planning.
  - Activity leader: SINTEF
- A5: Project management, reporting and quality assurance.
  - Activity leader: SINTEF

The deliverables from the main activities A1, A2, A3, and A4 (denoted ref. 1, ref.2, ref. 3., and ref. 4, respectively[2]) are summarised and in Chapter 4 (A1-A3) and Chapter 5 (A4).

[2] Full references to these deliverables are provided in Chapter 6.

3.3 Meetings

More than 30 meetings and presentations have been held as part of the project:

- Meetings with partners in the project consortium
- Meetings with possible users and stakeholders
- Presentations at conferences
- Status meetings with clients
- Project meetings

The meetings are referenced in the APPENDIX to this Executive Summary.

4 Results

4.1 A1 – Users and stakeholders survey (ref. 1)

An important activity in the *i-Nord* pre-project has been to collect information from all the main interest groups and stakeholders related to such a system. These comprise:

- *Suppliers of information*, such as Institute of Marine Research, The Norwegian Polar Institute, Nansen Environmental and Remote Sensing Center, The Norwegian Meteorological Institute, etc
- *Official authorities*, such as The Norwegian Coastal Administration, The Joint Coordination Rescue Centres, Norwegian Pollution Control Authority, etc.
- *Industrial manufacturers and suppliers*, KONGSBERG Group, Fugro Oceanor AS, SAAB Group, etc.
- *Universities and research institutes*, such as the University of Tromsø, NTNU, University of Bergen, NORUT, Norwegian Institute for Water Research, Norwegian Institute of Air Research, etc.
- *Consumers* of High North information and services, such as the governmental agencies, public sector in general, citizens, commercial businesses, international partners, etc.

These groups cover a wide range of interests, and play various roles. The *i-Nord* pre-project has therefore been focused on future (and evolving) solutions of systems and infrastructures to facilitate better interaction, interoperation and cooperation between the different interest groups in a much more efficient way than today's infrastructures and systems provide.

The organisations which have been involved in the survey are listed in the APPENDIX.

A summary of the main results of the survey

One of the conclusions of the *i-Nord* project is that a surveillance system for the High North should be public, very flexible, and very dynamic; facilitating integration, interoperability and scalability

- *i-Nord* should not be regional, i.e. only the Barents Sea, but also include the Nordic Seas and the Arctic Ocean, etc.
- *i-Nord* must be able to communicate and interact with other similar national and international systems, e.g. AIS (Automatic Identification System), GMES (Global monitoring for environment and safety), and projects like MyOCEAN, etc.
- The *i-Nord* system should be able to operate in different modes so that both large open ocean areas, costal waters, and even fjords can be included in a seamless way.

- The *i-Nord* system must be based on internationally accepted standards, including the relevant application domains and reliability, security, and safety requirements. It should also function on a 24-7 basis.
- *i-Nord* must be service oriented[3] and must be universally accessible.

Project partners that are currently authorized with responsibility for surveillance of the High North have specified the following overall system requirements:

- A higher degree of integration of data and information that already exist in separate systems.
- More detailed observations of relevant parameters by means of new and more plentiful sensors and sensor networks. This will enhance the quality of existing models. This information is also vital for a better understanding of environmental aspects such as weather and climate, resource management, etc., which are crucial for use in prediction and decision support systems.
- A more flexible support for new services and new models that cannot be achieved by today's infrastructures and systems, e.g. real time systems.
- A more flexible interface for a variety of end users. This will make the system more attractive than a dedicated system for specialized users.

These user needs and users requirements will form a basis for establishing the functional and technical specifications of the main project.

International collaboration

The partners in *i-Nord* have already a comprehensive international contact network and collaboration in all areas covered by the *i-Nord* concept. The collaboration will be further developed during the implementation of *i-Nord*. The collaboration will primarily be focused on the Nordic Countries, EU, USA, Canada and Russia.

EU is one of the key players in the Arctic. In 2002 EU stated the vision "Towards a Strategy to Protect and Conserve the Marine Environment". This vision was followed by several initiatives and in May 2008 the European Council adopted the **Marine Strategy Framework Directive**, which aims at ensuring healthy European marine waters by **2020**, taking into account the geographic and climatic specificity of different marine ecosystems.

It is underlined by the European Commission that the **Marine Strategy shall apply an ecosystem-based approach** to the management of human activities in order to:

- Ensure that the collective pressure of such activities is kept within levels compatible with the achievement of good environmental status
- And that the capacity of the marine ecosystem to respond to human induced changes is not compromised
- While enabling the sustainable use of marine goods and services by present and future generations

i-Nord is based on such an **eco-system approach** and a close collaboration with EU in implementing *i-Nord* is preferenced.

[3] Meaning that *i-Nord* is based on modern principles of software system construction, so that functionality, data products, and information are made available and accessible through the net (e.g., Internet).

4.2 A2 – System design and solution concept (ref. 2)

The intention of *i-Nord* is rather ambitious. It is supposed to be a tool for a variety of user groups, such as scientists, industry, public authorities (ranging from local to governmental, and international), as well as non-governmental institutions, and citizens. This tool should offer capabilities within areas of daily monitoring of various phenomena, management of resources and crisis management.

Given the ambitious intention of *i-Nord*, the new idea is that not only should data, products and information be easily available within the system, but also that potentially necessary interactions between various subsystems should be facilitated. *i-Nord* thus require interfaces for sharing data and production environments. This does not imply direct access to production chains, which in most cases would violate security policies of those owning the production chains, but definitions of interfaces that may be used in a secure manner to establish relationships between various subsystems that increase the overall performance of the system.

The *i-Nord* system has to cope with a wide variety of production environments as well as respecting existing IT-strategies within the service providers. As such, the fundamental principle of *i-Nord* development is definition of services and interfaces offered by existing systems and utilised within *i-Nord*. To generate a sustainable system the system should be designed in a manner compliant with other requirements the service providers have to fulfil (e.g. INSPIRE, GEOSS and WIS).

The *i-Nord* system should provide the services required to fulfill the overall objective of the system. This includes interactive and machine interfaces to catalogues (data discovery and data retrieval), interactive and machine interfaces to production chains, intersystem communication (e.g. notifications and warnings) and visualization (maps, time series, etc.). Service-oriented architecture (SOA) is chosen as the architectural principle, as this is viewed as the best current approach to satisfy the architectural goals of *i-Nord*, incl. internal and external security requirements such as IP-address filtering and access by username/password using secure HTTP servers, Public Key Infrastructure (PKI) and Virtual Private Networks (VPN). The security solutions will be certified by the Norwegian National Security Authority (NSM), and the NSM is pro-actively involved in these considerations.

The *i-Nord* overall system architecture has two main elements; *front-end services* and *backend services* (Figure 1). The backend services provide access to data and products. The front-end services typically provide User applications that can utilise the information provided by the backend services. The overall *i-Nord* SOA principles ensure and utilize the backend and front-end services interoperation.

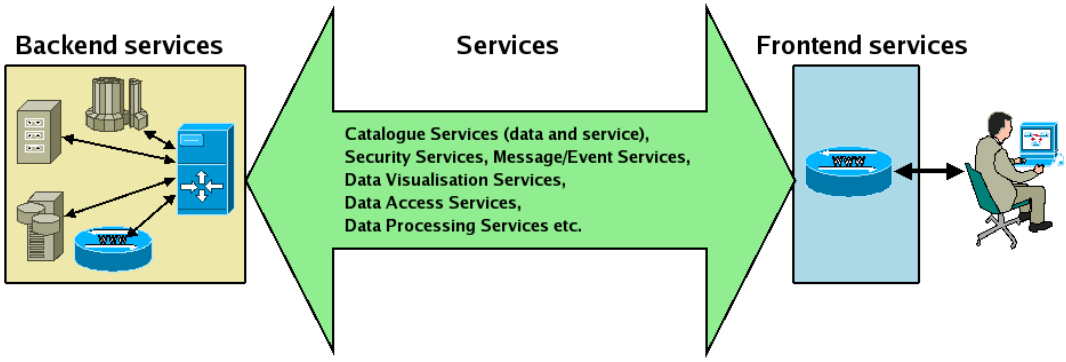

Figure 1 The main components of the *i-Nord* system

The figure above illustrates the main logical components of *i-Nord*, where the front-end serves the specific needs of the user, and the backend provides an interface to data and services (graphical, data access and processing services) offered by service providers within the system. The service bus includes the set of services and communication infrastructure that is required to make the system work as a whole. The *i-Nord* requirements are complex and are yet not fully explored. However a generic understanding of the system, following the principles of the conceptual view presented in Figure 1, is provided in Figure 2. Within this the need for open and secure communication (either in a group or bilaterally) is illustrated. Service and data access must be controlled by the appropriate metadata. Figure 2 is only one potential presentation of the *i-Nord* system with a Maritime Situation Awareness (MSA) perspective, the outline is by no means complete and is only meant as an example.

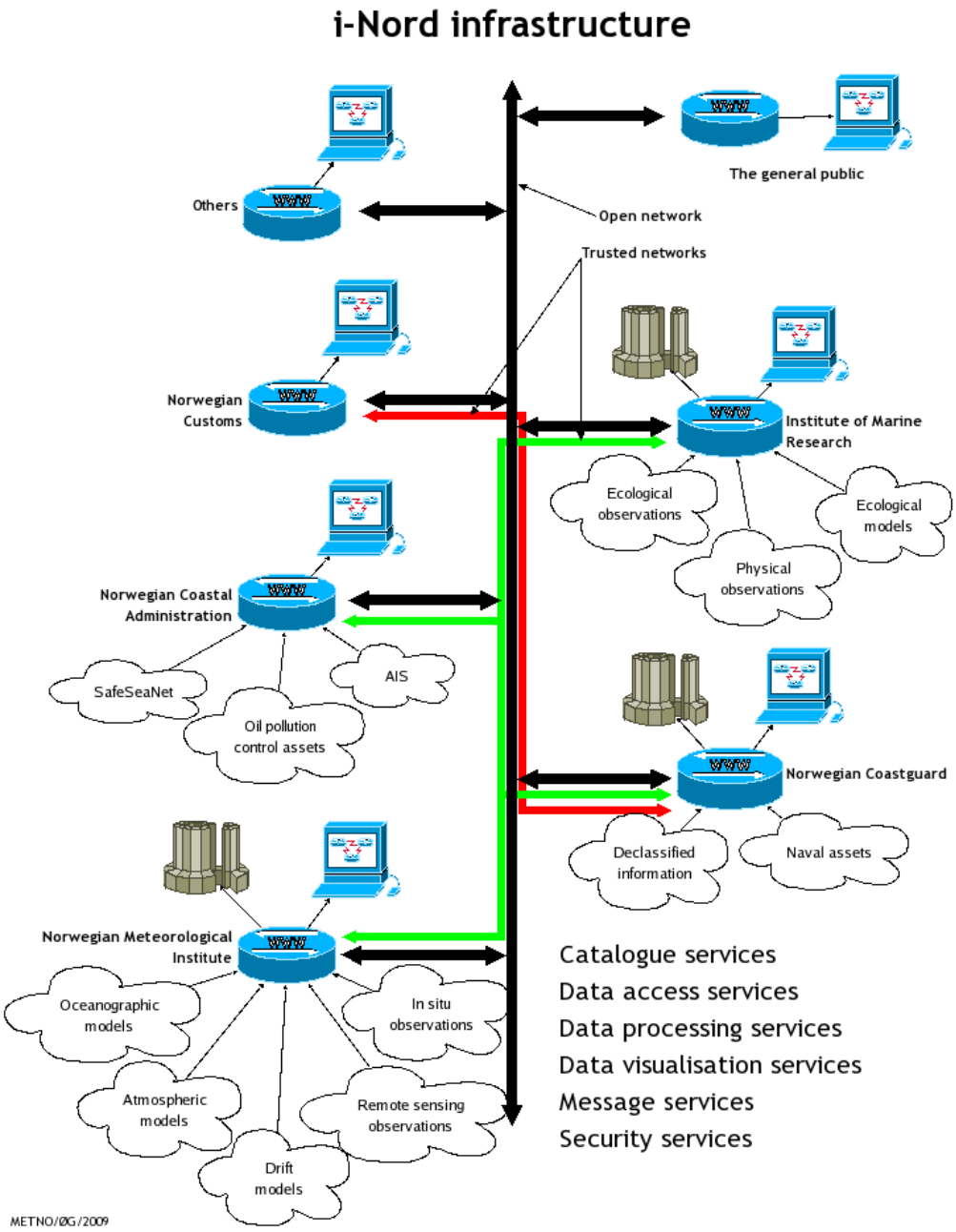

Figure 2 The *i-Nord* infrastructure

As the Figure above depicts *i-Nord*, the system integrates existing data sources, processing resources as well as support secure communication between users. Access to data should be done according to the authorisation level required by the dataset. This illustration is an outline of a potential MSA system and is by no means complete.

The *i-Nord* Demonstrator

As part of the A2 activity a demonstrator is developed. The demonstrator is set up to illustrate the type of services and interfaces *i-Nord* will support. The demonstrator is based on using existing systems and services as well as new services that may be developed in *i-Nord*. Based on these systems we have developed event driven scenarios, which are elaborated using a visual presentation based upon video techniques. No functional demonstrator is provided.

The demonstrator is being specified and designed using one of the scenarios. The demonstrator is then actually built as a movie[4] with extensive use of animations to visualise a real life emergency situation and operation, incl. the MSA perspective.

4.3 A3 – Base-line for the main project and need for research and development. (ref. 3)

The knowledge base and need for research within *i-Nord* is related to the goal to: *Deliver operational information of the marine environment and ecosystems of the Nordic Seas and Artic Ocean, incl. Norwegian coastal areas. Support and improve marine research and knowledge-based ecosystem assessment prediction and management, marine operations, and marine safety.*

A general challenge is to optimize observational systems in concert with mathematical models in relation to user oriented products and needs.

Operational atmospheric forcing, physical oceanography and climate are key factors for serving most products anticipated within *i-Nord*. The status of knowledge and operational skills are quite advanced in Norway on these themes, with good international cooperation. However, there are clear needs for regional and local developments due to the specifics of the high north and the need for relatively high time and space resolution on some of the products.

Pollution is a major potential threat to the marine ecosystems, and except for oil spill pollution, our ability to realistically estimate the distribution in time and space is limited, partly due to lack of source information. A major issue is to estimate the overlap and doze of contaminants on biota, and combined with laboratory experiments of contaminant effects on individuals; estimate the effects on total stocks of e.g. plankton and fish and threats to birds and fish farms.

There is a great lack of integrated modelling and observational systems to quantify and predict the variability of the marine ecosystems. Several research and semi-operational systems of parts of the ecosystems are developed, but we lack a “system of systems” to integrate the knowledge and methodology already existing. An ecosystem modelling system (Atlantis) is already developed (in Australia) for this purpose, which need to be implemented and adapted for the northern ecosystems. In addition developments are needed for better quantification of specific species groups as either stand alone products or input to the Atlantis model. Certainly improved observational systems are important for producing realistic results. We need to improve the data flow and ensure that the flow is functioning well and be as up-to-date as possible, from observation to analyzed result.

The main information needed to better serve marine operations is related to improve the physics (currents, wind, waves, temperature, salinity (density), sea ice (distribution, thickness, type) and icing, meaning improved combination of observations (from ships, buoys, AUVs, radars, satellites and aircrafts) and numerical models. This also means increased use of new platforms (e.g unmanned aircrafts) and sensor technology, and improved understanding and application of e.g. satellite data. It also means improved (particularly underwater) communication and streamlining of data flow for a range of downstream service providers and direct users.

[4] We have used external experts on professional video and animation productions.

The above requirements are also of utmost importance for handling of crisis and related to marine safety. This includes search and rescue support to rescue centres, support to Norwegian coastal administration and support to the police.

5 A4 – Main Project Proposal (ref. 4)

5.1 Summary of the proposal

The Norwegian Government consider establishing a sustainable and multidisciplinary project on ocean surveillance in the Barents Sea and Artic ocean henceforth called the ***i-Nord project***. The project it foreseen to be initiated in 2009 and gradually implemented towards a fully functional systems towards 2017. The ***i-Nord*** project proposal is based on the Norwegian Government's High North Strategy.

The main objective of the *i-Nord* project proposal is to:

Implement and operate a comprehensive monitoring, prediction and information system for the High North ocean areas.

The project objective will be obtained through initiating activities in:

- **Maritime safety, security and operations** – focusing on an integrated monitoring and early warning system as day-to-day vessel monitoring, maritime risk assessment, and maritime crises management.
- **Marine environment and climate** – to be able to meet the increases challenge in anthropogenic activities, and conflict of interest between oil/gas activities and fisheries along with climate change and its impact.
- **Marine resources** – to meet the challenges for management of the living marine resources together with focus on the demanding perspective on implications of human activities and operational management of northern areas,

reflecting applications and requirements, realised and implemented through activities focusing on:

- **System architecture and information management** – for creating and maintaining interoperability infrastructure for both internal and external users of the *i-Nord* system.
- **Communication systems and infrastructure** – for transferring and supporting necessary surveillance information and sensor network data for evolution of the environment and pollution threats.
- **Observation systems and models** – retrieving information from in-situ and remote sensing sources for development of reliable and predictive models.
- **System Coordination and Support** - will secure interoperability between the different systems to be integrated as well as maintaining operational continuity of the services of the *i-Nord*.

These activities are hereinafter respectively referred to as the "vertical" and "horizontal" work packages (WPs), as shown in Figure 3.

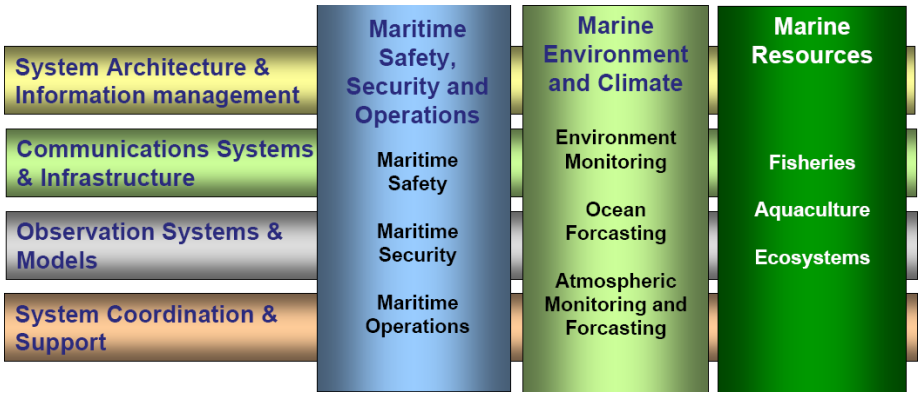

Figure 3 The *i-Nord* project structure

The vertical WPs of Figure 3 are user and application/service oriented activities, whereas the horizontal WPs will answer and implement the demands put forward from the vertical WPs, thus resulting in technical solutions.

For obtaining the overall goal of the intention of the *i-Nord* proposal, both extension of on-going research and development activities in both industry and research/university communities are proposed, as well as new initiatives leading to new products for the industrial sector.

i-Nord is proposed to be an on-going activity for more than a decade, as detailed and described in the different work package descriptions. There are also proposed "Fast-Track" activities/services:

- Decision support to the Norwegian Coast Guard
- Iceberg detection and warning
- Oil spill detection and warning
- Harmful algal blooming detection and warning
- Marine ecosystem resource monitoring
- Ocean Space Surveillance (awarded strategic project at SINTEF)
- MyOcean (collaborative and coordinative activities)

demonstrating the initial potential of the *i-Nord* concept. Simultaneously, phase 1 activities are initiated in each of the WPs.

The *i-Nord* project activities are proposed to be carried out through five phases were:

- **Phase I** – initiates the first "Fast Track" services as well as identifying specifications and requirements for the first prototypes to be developed. This prototype will demonstrate the synergy and value added services. Simultaneously planning will be worked out for the future concepts, thus identifying needs for R &D activities as well as infrastructure.
- **Phase II** – Iterative implementation and further system and service integration according to the results and requirements of phase 1. Continued R&D activities from phase 1 are also foreseen. Consolidation will be prioritised to obtain best possible results.
- **Phase III, IV and V** - Consolidation of phase I and II along with further iterative implementation. Dissemination from the previous phases will be an important issue throughout all of these phases.

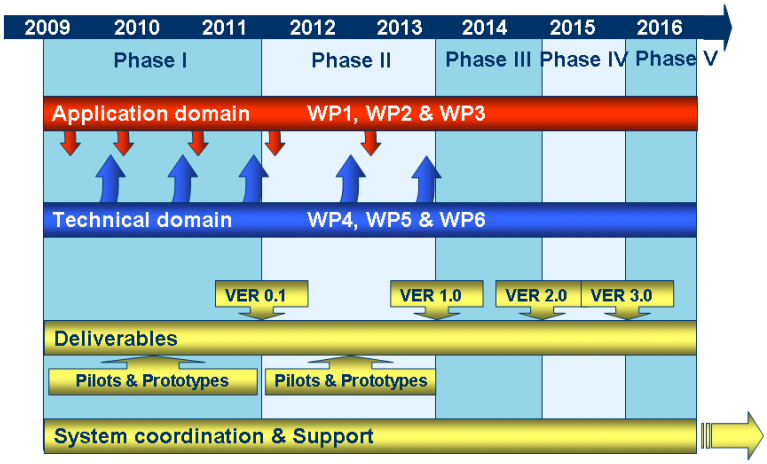

Figure 4 The *i-Nord* proposed project phases

5.2 Budget and financing (ref. 4)

The two first phases have an estimated budget as shown in the following table.

Table 2 Proposed budget for *i-Nord* project activities

i-Nord Budget								
Phase	Phase I			Phase II		III	IV	V
Work Package Breakdown	2009	2010	2011	2012	2013	2014	2015	2016
WP 1: Maritime Safety, Security and Operations	5.000	7.000	8.000	8.000	8.000	TBD	TBD	TBD
WP 2: Marine Environment and Climate	4.000	6.000	8.000	8.000	9.000	TBD	TBD	TBD
WP 3: Marine Resources	4.000	6.000	8.000	8.000	9.000	TBD	TBD	TBD
WP 4: System Architecture and Information Mgm.	5.000	10.000	10.000	11.000	11.000	TBD	TBD	TBD
WP 5: Communication Systems og Infrastructure	2.000	4.000	7.000	7.000	7.000	TBD	TBD	TBD
WP 6: Observation Systems and Models	2.500	7.000	10.000	15.000	20.000	TBD	TBD	TBD
WP 7: System Coordination and Support	1.000	2.000	3.000	4.000	6.000	TBD	TBD	TBD
WP 8: Quality Assurance	500	1.000	1.000	1.000	1.000	TBD	TBD	TBD
WP 9: Program Management	3.500	6.500	6.500	6.500	6.500	TBD	TBD	TBD
Total	27.500	49.500	61.500	68.500	77.500			
Accumulated	27.500	77.000	138.500	207.000	284.500			

The proposed funding strategy of *i-Nord* is shown in Table 2.

Table 3 *i-Nord* funding strategy

i - Nord Funding Strategy					
	2009	2010	2011	2012	2013
Norwegian Governmental Funding	27.500	49.500	56.000	60.000	60.000
International Governmental Funding	0	0	5.000	8.500	17.500
Estimated Gross Governmental Funding	27.500	49.500	61.000	68.500	77.500
Framework Program Funding (FP 7)	10.000	10.000	10.000	TBD	TBD
Project Partner Funding	5.900	5.900	5.900	5.800	TBD
Estimated Gross Partner Generated Funding	15.900	15.900	15.900	5.800	0
Gross i-Nord related Funding	43.400	65.400	76.900	74.300	77.500

The funding scheme is based on the following strategy:

- **Norwegian Governmental funding** – contribution from the Norwegian Government to the *i-Nord* community.
- **International Governmental funding** – Funding from other Governments to the *i-Nord* community.
- **Framework Program Funding** – are activities funded through the European Commission R&D schemes, and coordinated with the planned working tasks in *i-Nord*. Some beneficiaries have on-going FP 7 projects, as well as planned submissions of project proposals for the forthcoming calls. Examples of present known co-financed FP 7 projects are: MyOcean (METNO et all).
- **Project partner/Internal funding** – which is beneficiary funded activity coordinated with the work package description, such as OSS – Ocean Space Surveillance (SINTEF).

5.3 Project organization

Figure 5 depicts the project structure and the management structure of the *i-Nord* main project

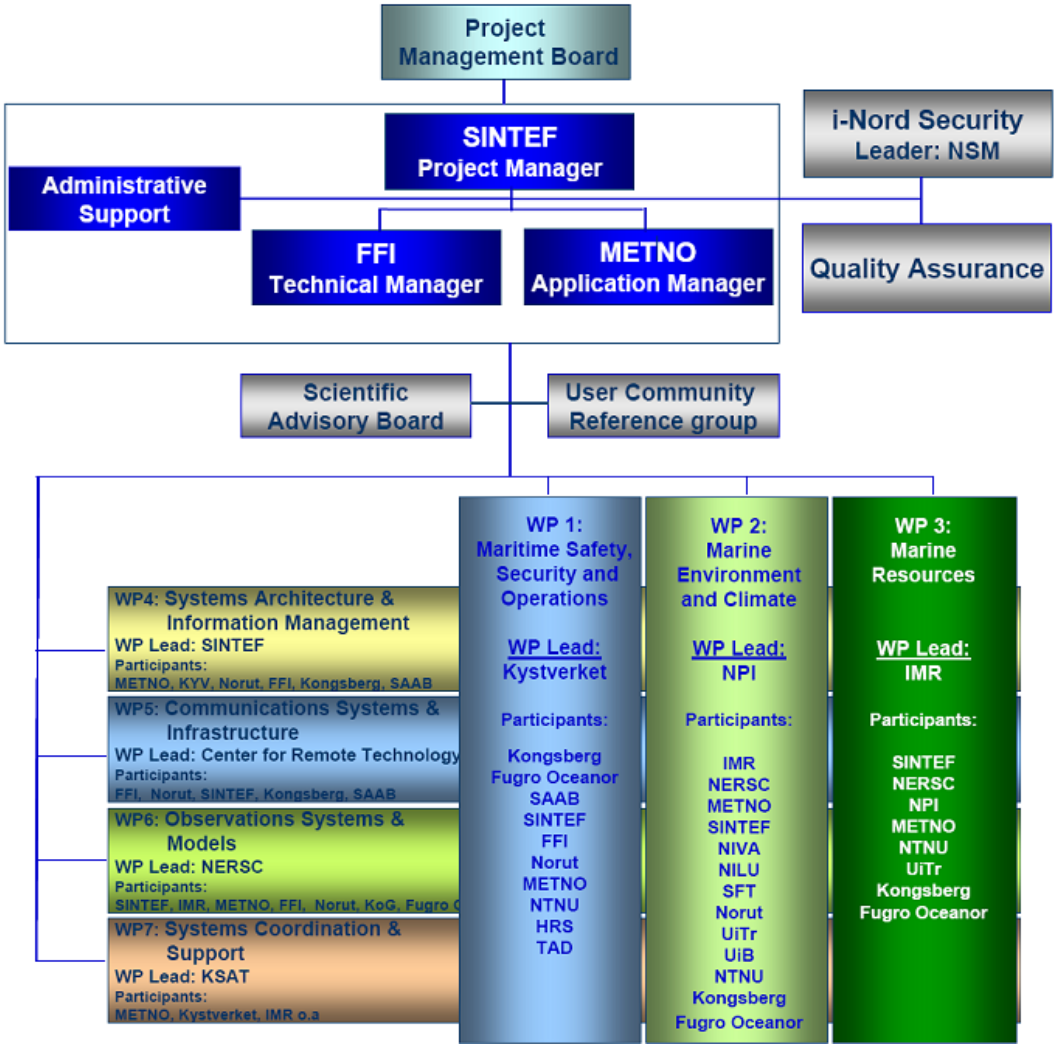

Figure 5 The *i-Nord* project organization and management structure

e following table outlines the roles and responsibility of this structure.

Table 4 Management structure

Level	Body	Composition	Principal Responsibilities
Project as a whole	Project Management Board	5-8 authorized representatives.	• Strategic decisions. • Resolution of any major conflicts • Overall project governance and management
	Project Activity Coordination	Project Manager, Application Manager, Technical Manager and Work Package Leaders	• Make strategic decisions concerning project co-ordination and direction, • Overall technical management and planning. • Project Risk Management.
	Project Management	Project Manager, administrative support	• Implement decisions of the Project Management Board and Project Activity Coordination • Assist all other management bodies. • Overall day-to-day project management.
Work Package (WP)	WP Leader	One responsible person per WP	Co-ordinate a specific WP, and report on progress of detailed work in the WP.

6 References

ref. 1. SINTEF MEMO: "*i-Nord* pre-project. Users and stakeholders survey". To be obtained from the contractors of the *i-Nord* pre-project.

ref. 2. SINTEF MEMO: "*i-Nord* pre-project. Description of system concepts, including demonstrator", To be obtained from the contractors of the *i-Nord* pre-project.

ref. 3. SINTEF MEMO: "*i-Nord* pre-project. Base-line for main project". To be obtained from the contractors of the *i-Nord* pre-project.

ref. 4. SINTEF REPORT: "*i-Nord*. Project Proposal". To be obtained from the contractors of the *i-Nord* pre-project.

APPENDIX: Meetings overview

The following meetings have been carried out as part of the project

Meetings with partners in the consortium

Research institutes:

- Institute of Marine Research (IMR)
- Nansen Environmental and Remote Sensing Center (UNERSC)
- Northern Research Institute Tromsø (NORUT)
- Norwegian Polar Institute (NPI)
- Norwegian Defence Research Establishment (NDRE/FFI)
- Norwegian Meteorological Institute (met.no)
- Norwegian Institute of Water Research (NIVA)
- Norwegian Institute for Air Research (NILU)
- SINTEF

Universities:

- University of Tromsø , Center for Remote Technology
- Norwegian University of Science and Technology (NTNU)
- University of Bergen, Geophysical Institute (UiB-GFI)

Industry:

- Kongsberg Group (KOG)
    - Kongeberg Spacetec AS
    - Kongsber Satellite Services AS (KSAT)
    - Kongsberg Defence and Aerospace AS (KDA)
- Fugro OCEANOR AS
- SAAB Group

Meetings with possible users and stakeholders

- StatoilHydro
- ConocoPhillips
- Shell
- ACONA (ArcticWeb)
- Management Forum
    - Advisory group on monitoring
    - Forum on environmental risk management
- Norwegian Space Centre (NR)
- Norwegian Coastal Administration (Kystverket)
- The Norwegian Pollution Control Authority (SFT)
- Norwegian Coastguard
- The Directorate for Nature Management (DN)
- Ministry of the Environment (MD)
- Municipals and County Municipalities of Northern Norway
- Fellesoperativt hovedkvarter (FOHK)
- Landsdelskommando Nord-Norge (LDKN)
- Norwegian Police Directorate
- The Customs Authorities

- National Safety Authority (NSM)
- The Governor of Svalbard (Sysselmannen)
- University Centre in Svalbard (UNIS)

Collaboration meetings with the Norwegian Coastguard, *i-Nord* and stakeholders to the Coastguard's project "Beslutningsstøtte Kystvakt" (Decision support Coastguard):

- The Directorate of Fisheries
- Institute of Marine Research (IMR)
- Norwegian Nature Inspectorate (Statens Naturoppsyn (SNO))
- Police Department
- The Customs Authorities
- FOHK
- FK KKIS
- Joint Rescue Coordination Centre (HRS)
- Norwegian Police Directorate
- FOHK
- Met.no
- KNMT METOC

Presentations at conferences

- Maritime Situational Awareness seminar.
- Norwegian Research Council "Northern Area Conference"
- Svensk-norsk samarbeide i Nord, Tromsø, 1-2 september 2008

Status meetings with ministries

- Oslo 25. August
  - Ministry of Fisheries and Coastal Affairs (FKD), Client
  - Ministry of Foreign Affairs (UD), Client
  - Minister of the Environment (MD)
  - Ministry of Defence (FD)
  - Ministry of Justice and the Police (JD)
  - Ministry of Trade and Industry (NHD)
  - Ministry of Education and Research (KD)
- Oslo 5. November
  - FKD, UD
  - MD, FD, JD, NHD
- Oslo 10. December
  - UD

Project meetings

6 project meetings were held at Gardermoen with the members of the consortium. The number of participants was ranging from 16 to 25.

- 23. June
- 11. August
- 15. September
- 13. October
- 10. November
- 8. December