CRISALIDE - Concept of Corporative Information System for Governance and Management of Digital City

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Introduction

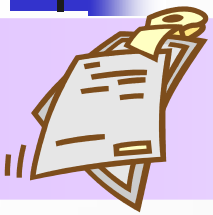
Main goal – a software on IGIS base localization (A3 series) for DMSS development for a city government

DMSS is a tool for intelligent decision making support of corporative control of city environment

Base of DMSS: an intelligent subsystem, GIS, communication subsystem, mathematical and simulation models

Subject domain for DMSS: computer support of government activities and control for all levels of city hierarchy

Expected results



Governance and Control Cycle (GCC) for a city government

Adapted Intelligent GIS

Electronic document flow

Systems of ontologies, data and knowledge base, scenarios of main activities and business process

The main theoretical approach

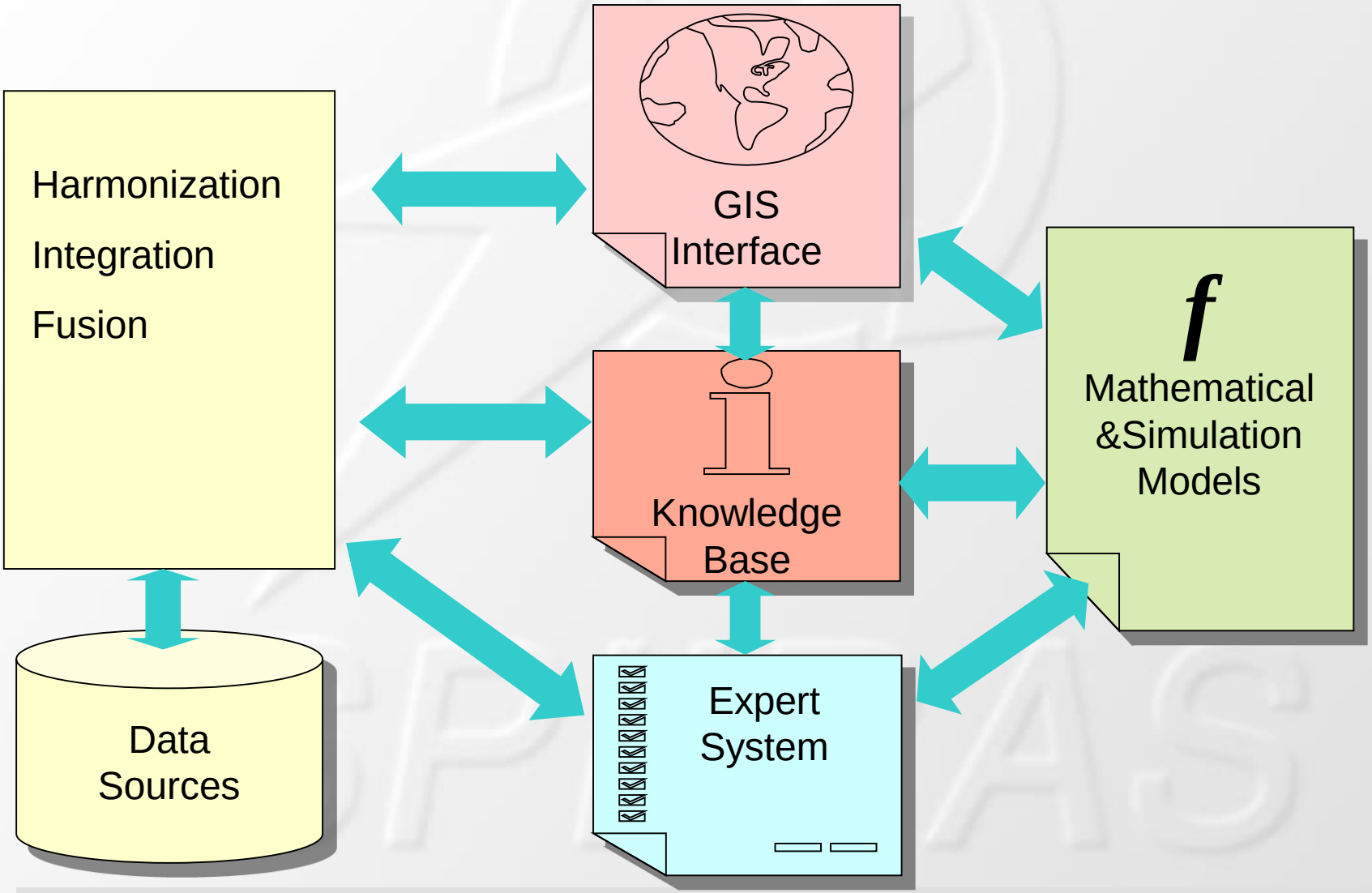
Data Harmonization – standardization of data from various sources to a common format

Data Integration – bringing together information about the object from different sources

Data Fusion – the process of obtaining new knowledge about the object through intellectual processing of data at hand

Information Fusion

Intelligent geographic information systems



Process. Subject domain investigation

1. Level of government automation investigation

2. Business process management investigation

3. Ontology system development

Investigation of Level of Government Automation

Should be included:

- Classification of existing information systems and subsystems
- Examination of existing software information systems of the company with regard to CIS integration
- Estimation of necessary directions of capacity building in the complex of means of automation

Business Process Management Investigation

- Analysis of a cycle of city managementy
- Analysis of levels of city management (strategic, regional, local)
- Analysis of phases of management (input data processing, concept formulation, decision making, planning and execution, activity analysis and control)
- List of automated management tasks

Business Processes Classification

Levels of business processes

Strategical

Forms activities of the company in the long term and reflects global trends in business

Regional

Reflects task solving in the medium term (business processes of government level)

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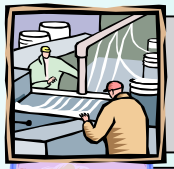
Local

Business processes that reflect short term perspective: from real time to a year (business processes of department or workshop level)

Groups of BP



Major

Directly determines major result of government's functioning

Auxilary

Ensures major business processes (supports government's infrastructure)

Supporting

Government's processes that support all major and auxiliary processes

Expected Results of BP Analysis

Establishing a list of automated management tasks for the Government

Methodological apparatus that supports identification of business processes

Models of decision-making support for each level of business processes

Description of vertical and horizontal links between business processes

Models of management object's behaviour with indication of states and transitions

UML-models of business processes mangement system

Formal descripion of business processes

- Management function
- Management subject and object
- Engaged resources
- Model of management decision-making support
- Points of interaction with other business processes

Ontology system development

Ontology is a set of notions from the subject domain and the links between them

CIS must provide a single model of information representation for all participants of company's business processes — users and components of CIS. One form of single model of information representation is ontology system

Ontology is characterized by unity, completeness and consistency of the notions used. Creation of ontology, besides uniformity of data representation, allows to form more holistic view of the subject domain, to identify the missing knowledge components and to increase effectiveness of its reuse

Purpose of Ontology System

- To eliminate data redundancy
- To identify and formalize the missing data necessary for optimal business processes realization
- To take into account characteristic business processes and possible further changes in its structure and/or its functions
- To increase the effectiveness of data reuse
- To take into account processes that take place throughout the entire life cycle of CIS
- To support harmonization, integration and fusion of information within the system

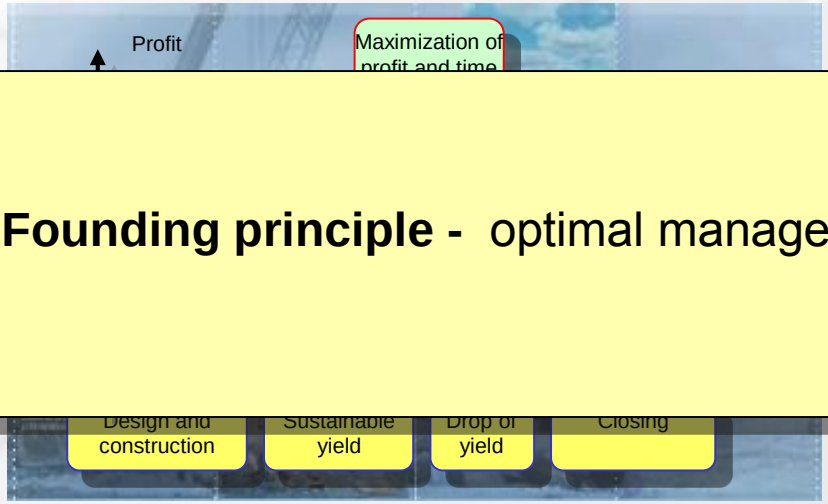
Common Architecture of DMSS

- Methodological support;
- Mathematical support;
- Informational support;
- Software support;
- Technical support;
- Security system;
- Extermal links system;
- Lifecycle structure.

Case study. YamburgGas

Company's Goal

Making profit by means of rational and effective development of gas, gas-condensate and oil fields in accordance with necessary environmental protection measures



Founding principle - optimal management of field's lifecycle!

Field's Lifecycle is the major management object of the company

A complete sequence of interconnected major and auxiliary business processes starting with exploration and evaluation of the field and ending with its closing

YamburgGaz BP Analysis

Criteria for evaluation of level of business processes

Strategical business processes

Model of business process *1*

Regional business process

Model of business process *2*

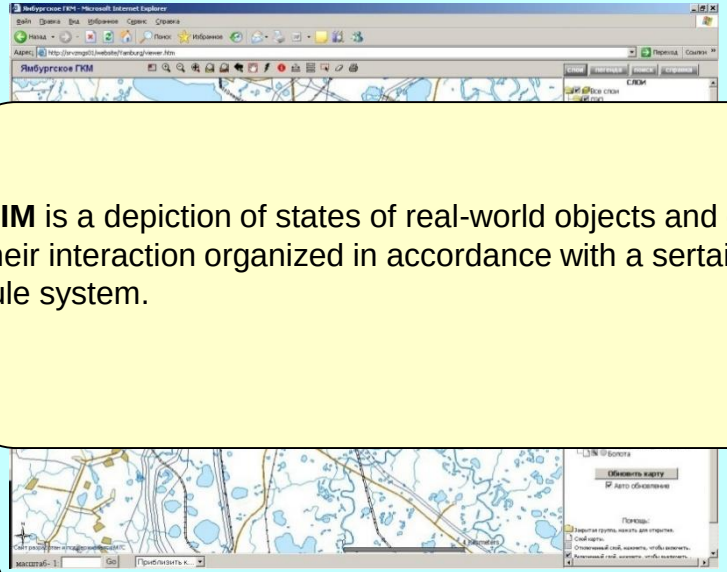
Local business process

Model of business process *n*

Information Support

Real World Objects

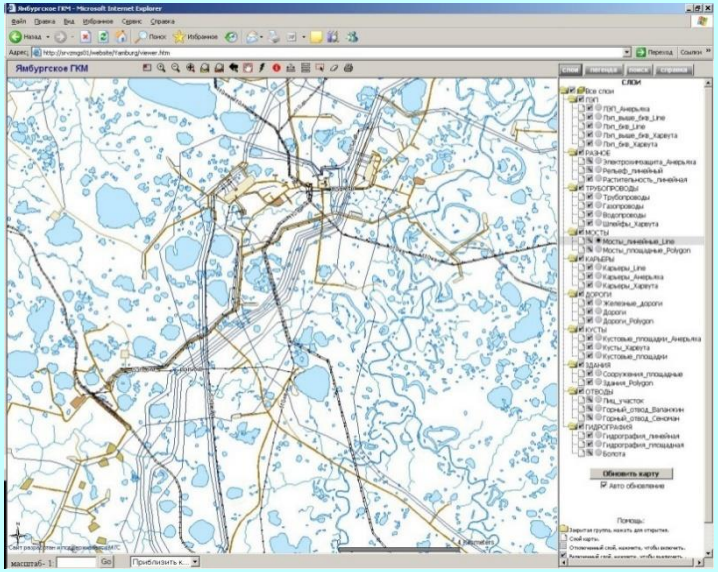
Dynamic Informatoin Model

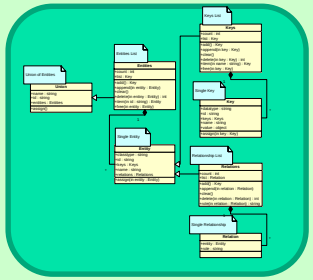


DIM is a depiction of states of real-world objects and of their interaction organized in accordance with a sertain rule system.

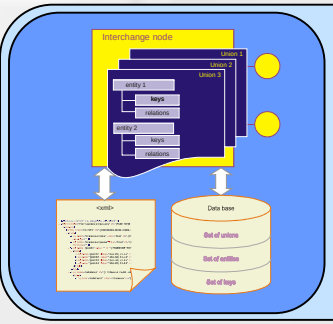
Dynamic Informatrion Model

DIM

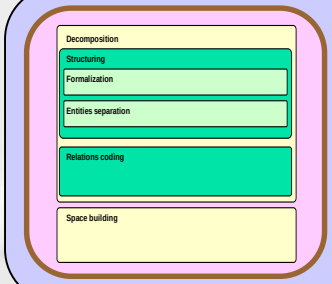




Single Model of Data Representation (SMDR) — universal informational-logical meta-model that provides software components with a structure of entities that describe the subject domain. SMDR specifies a rule system for DIM



Single Model of Informational Interaction (SMII) — universal metamodel that provides software components with a structure of entities contained within a message. SMII provides informational interaction between software components based on SMDR



Common method of information harmoniation (CMIH) to a single model of data representation — a method that suggests the common sequence of actions on data transformation from metamodel of any component to CMIH

Kronshtadt as a starting point of CRISALIDE

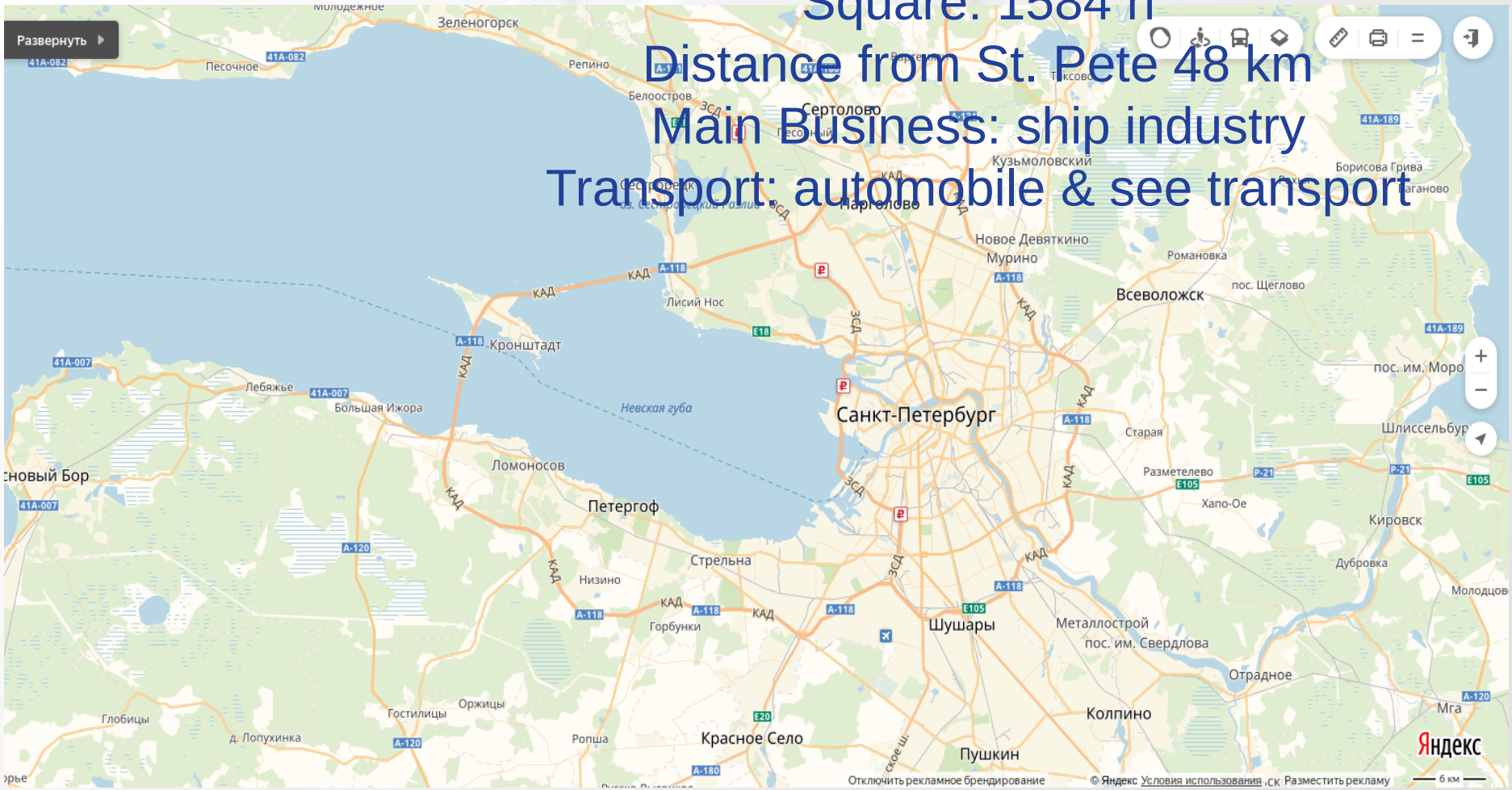
Population: 44 400

Square: 1584 h

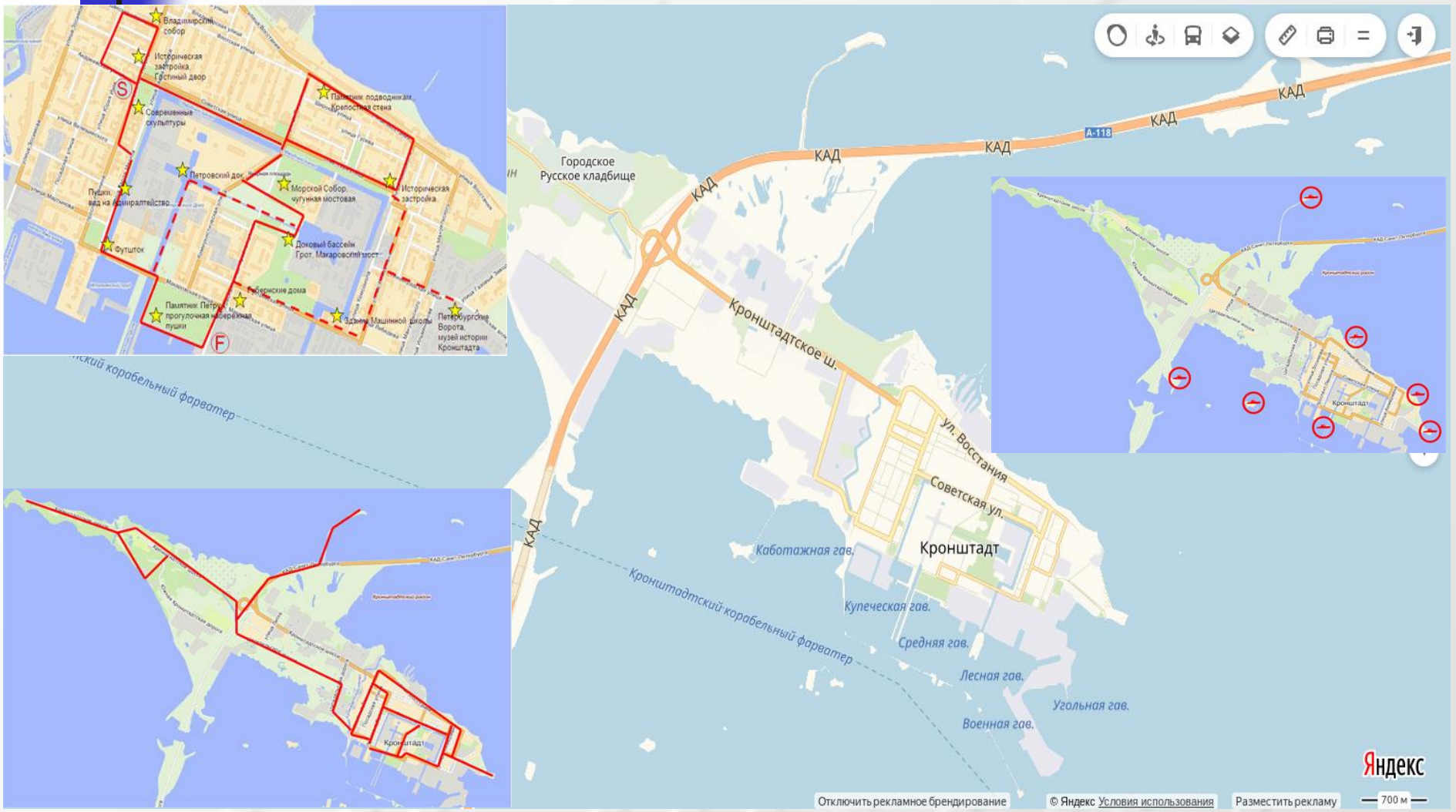
Distance from St. Pete 48 km

Main Business: ship industry

Transport: automobile & see transport



Subject Domain Investigation



Conclusion

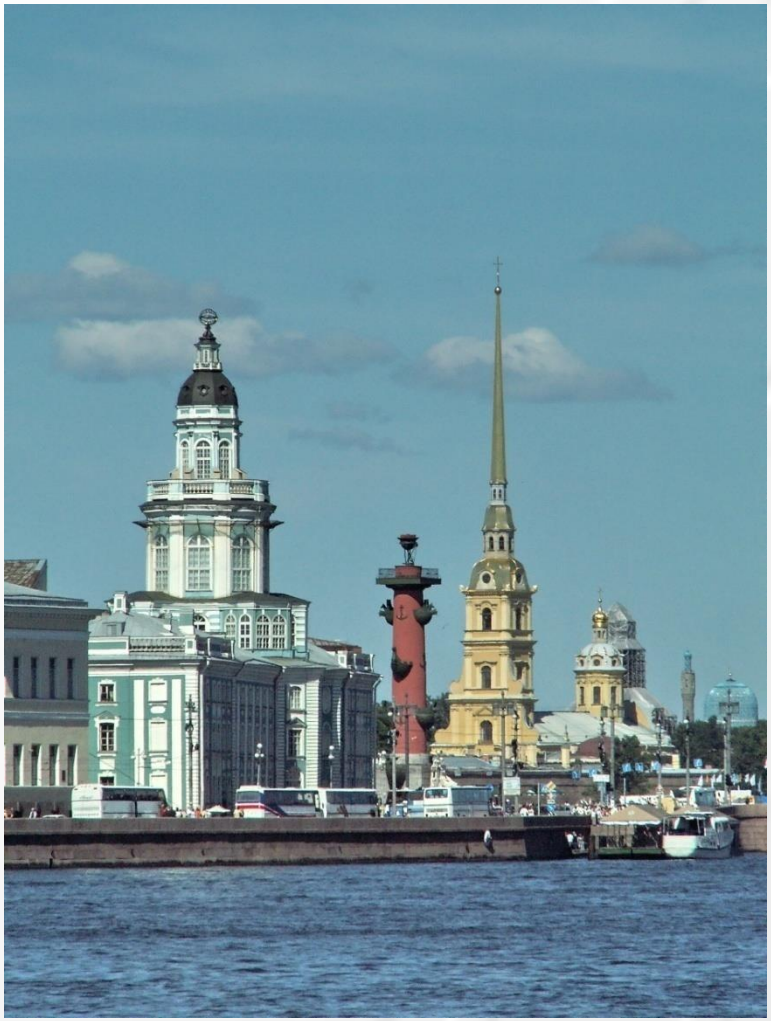
The main goal of DMSS for CRISALIDE is to support governance and management cycle for selected business processes

DMSS should be developed as an independent system for future localization in different megapolises in different countries

DMSS has a clear direction: to decrise the costs of governanse and management and to incrise the quality of social life of citizens

DMSS will be developed not as a standalone system only but more as a set of informational technologies that are ready to be integrated with others computer systems

Thank you!



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