EYATH'S ENVIRONMENTAL CARE AND PROACTIVE ACTIONS FOR THE THERMAIC GULF. THE REAL TIME SEWERAGE OVERFLOWS (REAL_T_SO) RESEARCH PROJECT

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BSB NetEco Workshop Training

Aristotle University of Thessaloniki, 23 October 2014

EYAO Quality in Life!
THESSALONIKI WATER SUPPLY & SEWERAGE Co S.A.

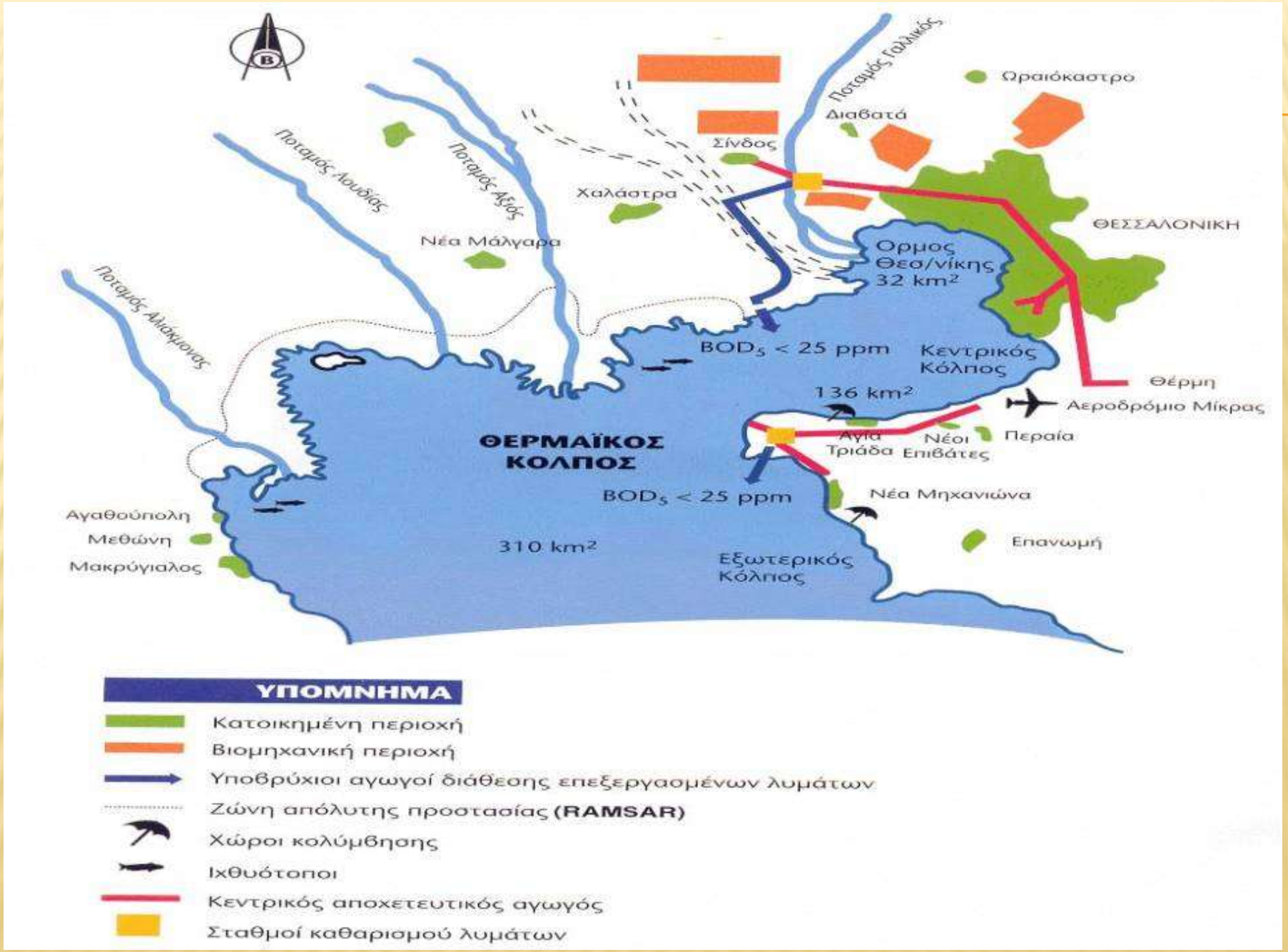
Black Sea CROSS BORDER COOPERATION

Real-t-SO
REAL TIME SEWERAGE OVERFLOW

BSB Net-ECO

INTRODUCTION

- Scope of the presentation
- Thermaic Gulf – the recipient
- EYATH Environmental care & Proactive actions
- Real _t_So Real time Operational tool


Ποταμός Γαλλικός
Ωραιόκαστρο
Διαβατά
Σίνδος
Ποταμός Λουδίας
Ποταμός Αξιός
Χαλάστρα
ΘΕΣΣΑΛΟΝΙΚΗ
Νέα Μάλγαρα
Ορμος Θεσ/νίκης 32 km²
Ποταμός Αλιάκμονας
BOD5 < 25 ppm
Κεντρικός Κόλπος
136 km²
Θέρμη
Αεροδρόμιο Μίκρας
Αγία Τριάδα
Νέοι Επιβάτες
Περαία
ΘΕΡΜΑΪΚΟΣ ΚΟΛΠΟΣ
BOD5 < 25 ppm
Νέα Μηχανιώνα
Αγαθούπολη
Μεθώνη
Μακρύγιαλος
310 km²
Επανωμή
Εξωτερικός Κόλπος
ΥΠΟΜΝΗΜΑ
Κατοικημένη περιοχή
Βιομηχανική περιοχή
Υποβρύχιοι αγωγοί διάθεσης επεξεργασμένων λυμάτων
Ζώνη απόλυτης προστασίας (RAMSAR)
Χώροι κολύμβησης
Ιχθυότοποι
Κεντρικός αποχετευτικός αγωγός
Σταθμοί καθαρισμού λυμάτων


12/6/2002 07:35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EYATH'S ENVIRONMENTAL CARE & PROACTIVE ACTIONS

- Expenditures for infrastructure
  1. Maintenance & replacement of old parts of the sewerage network
  2. Modernized sewer system ie. Separate systems instead of combined one
- Complying with the European Environmental Directives , the national laws and the approved Environmental Terms
- Aims to apply Real-time forecasting technologies for combined sewer systems
- Care for the rainwater esp during heavy rain and flooding periods
- Proper operation of the WWTPlants
- Sludge disposal & effluents reclamation to the agriculture
- Contact with the public and the stakeholders

THESSALONIKI –EYATH'S DATA

- 1,200 000 inhabitants
- 1.700 km total sewerage network
- Densely built-up centre
- Combined sewer system in the city
- 3 Wastewater Treatment Plants for :

1. Thessaloniki WWTP 296.000m3 capacity (DF 175.000m3)
2. Touristic area's WWTP 27.000 m3capacity (DF 9.000m3)
3. Industrial area 17.000m3 capacity (DF 7-14.000m3)

- 3 accredited Laboratories

MONITORING SCHEME

Aiming in achieving good ecological status under the WFD

- Sampling once per two months the department of Environmental Management of EYATH s.a. from various points near the shore of the Gulf of Thessaloniki which are examined for microbiological,physicochemical parameters.
- "Andromeda",sensors for the monitoring of the marine environment. The following parameters were monitored on a continuous basis (Dissolved oxygen , salinity , turbidity, temperature,pH) . **It stopped**
- Hellenic Center for Marine Research

Very extensive studies for the last 10 years monitoring several parameters physicochemical , biological etc parameters for assessing the trophic conditions of the Thermaic Gulf. Samples were taken regularly from a total of 24 sampling stations throughout the Thermaic Gulf. EYATH has funded several of these studies.

- Continuous on –line conductivity measurements of the inflow& effluents at the WWTP

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Present state

Περιοχή	PO_4	NO_3	NH_4	Chl-α
Thessaloniki Bay – Port	⇓	⇓	↓	⇓
Thessaloniki Gulf – Sewage Outfall Area	↓	↓	↓	⇓
Thessaloniki Gulf – Estuaries	⇓	↓	↓	↓
Thessaloniki Gulf - Aghia Triada	⇓	↓	↓	
Inner Thermaikos Gulf – Megalo Emvolo	⇓	⇓	↓	
Inner Thermaikos Gulf – Reference Station	-	↑	⇑	

Wastewater Treatment Plants of EYATH

Thessaloniki Wastewater Treatment Plant

Quality characteristics of the effluents

pH	**7.2**
Conductivity(mS/cm)	**3.5**
SS (mg/l)	**<20**
BOD5 (mg/l)	**<15**
COD (mg/l)	**<80**
Cl-(mg/l)	**≈ 800**
NH4-N(mg/l)	**0,8**
NO2-N (mg/l)	**0,05**
NO3-N (mg/l)	**2,5**
TKN (mg/l)	**4,0**
P-PO4ortho (mg/l)	**4,3**
P-PO4total (mg/l)	**5,4**

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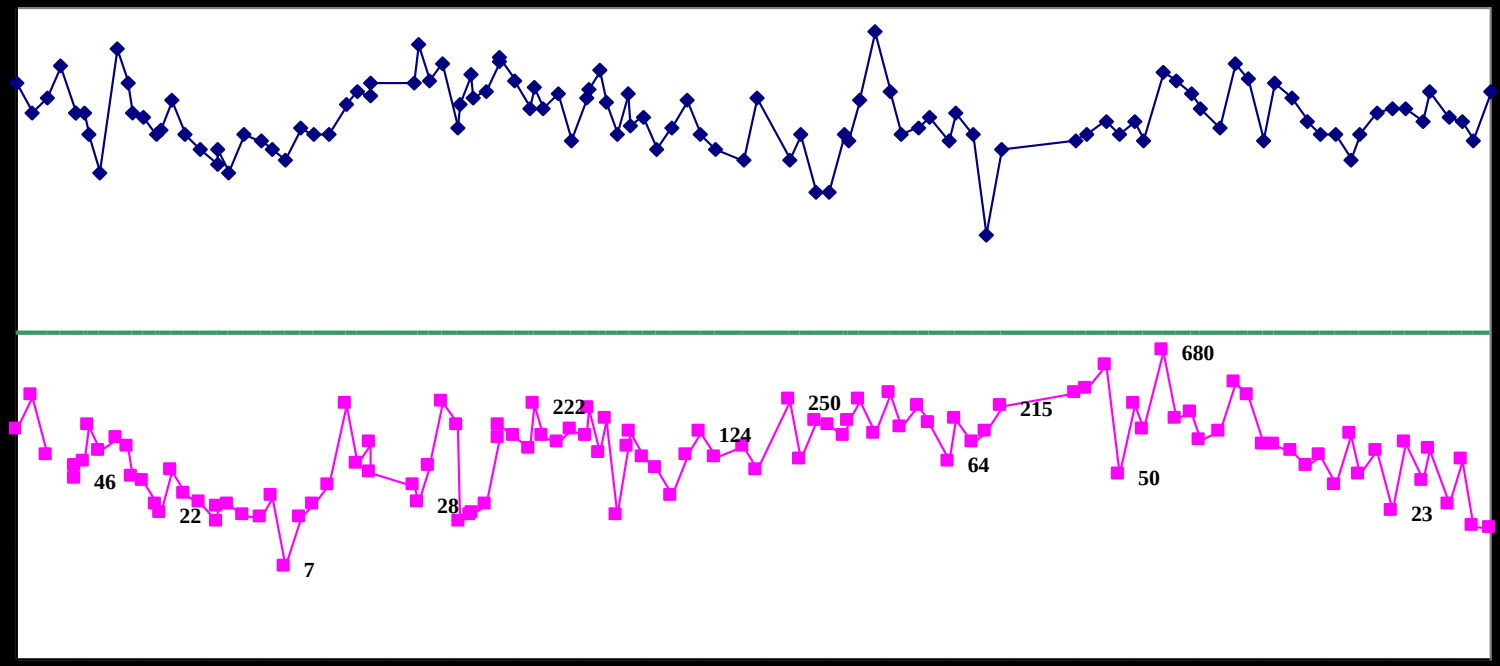
FINAL DISINFECTION RESULTS



SLUDGE DISPOSAL PRESENT& FUTURE ACTIONS

RECLAMATION OF THE TREATED EFFLUENTS

THE PARTNERS & THE NATIONAL FUNDING FRAMEWORK

Real Time Operational Control Tool of Combined Sewerage Overflows (CSO's) at Coastal cities

ΕΥΔΘ Ποιότητα ζωής!
ΕΤΑΙΡΕΙΑ ΥΔΡΕΥΣΗΣ & ΑΠΟΧΕΤΕΥΣΗΣ ΘΕΣΣΑΛΟΝΙΚΗΣ Α.Ε.

ΑΡΙΣΤΟΤΕΛΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΕΣΣΑΛΟΝΙΚΗΣ

ΔΗΜΟΚΡΙΤΕΙΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΘΡΑΚΗΣ

kartEC
environmental and energy engineering consultancy

ΕΥΡΩΠΑΪΚΗ ΕΝΩΣΗ
ΕΥΡΩΠΑΪΚΟ ΤΑΜΕΙΟ ΠΕΡΙΦΕΡΕΙΑΚΗΣ ΑΝΑΠΤΥΞΗΣ

ΑΝΤΑΓΩΝΙΣΤΙΚΟΤΗΤΑ ΕΠΙΧΕΙΡΗΜΑΤΙΚΟΤΗΤΑ ΕΠΑΝ ΙΙ
η περιφέρεια στο επίκεντρο της ανάπτυξης

ΕΣΠΑ 2007-2013

Υπουργείο Παιδείας και Θρησκευμάτων, Πολιτισμού και Αθλητισμού
ΓΓΕΤ – ΕΥΔΕ-ΕΤΑΚ

Ε.Π. Ανταγωνιστικότητα και Επιχειρηματικότητα (ΕΠΑΝ ΙΙ), ΠΕΠ Μακεδονίας – Θράκης, ΠΕΠ Κρήτης και Νήσων Αιγαίου, ΠΕΠ Θεσσαλίας – Στερεάς Ελλάδας – Ηπείρου, ΠΕΠ Αττικής

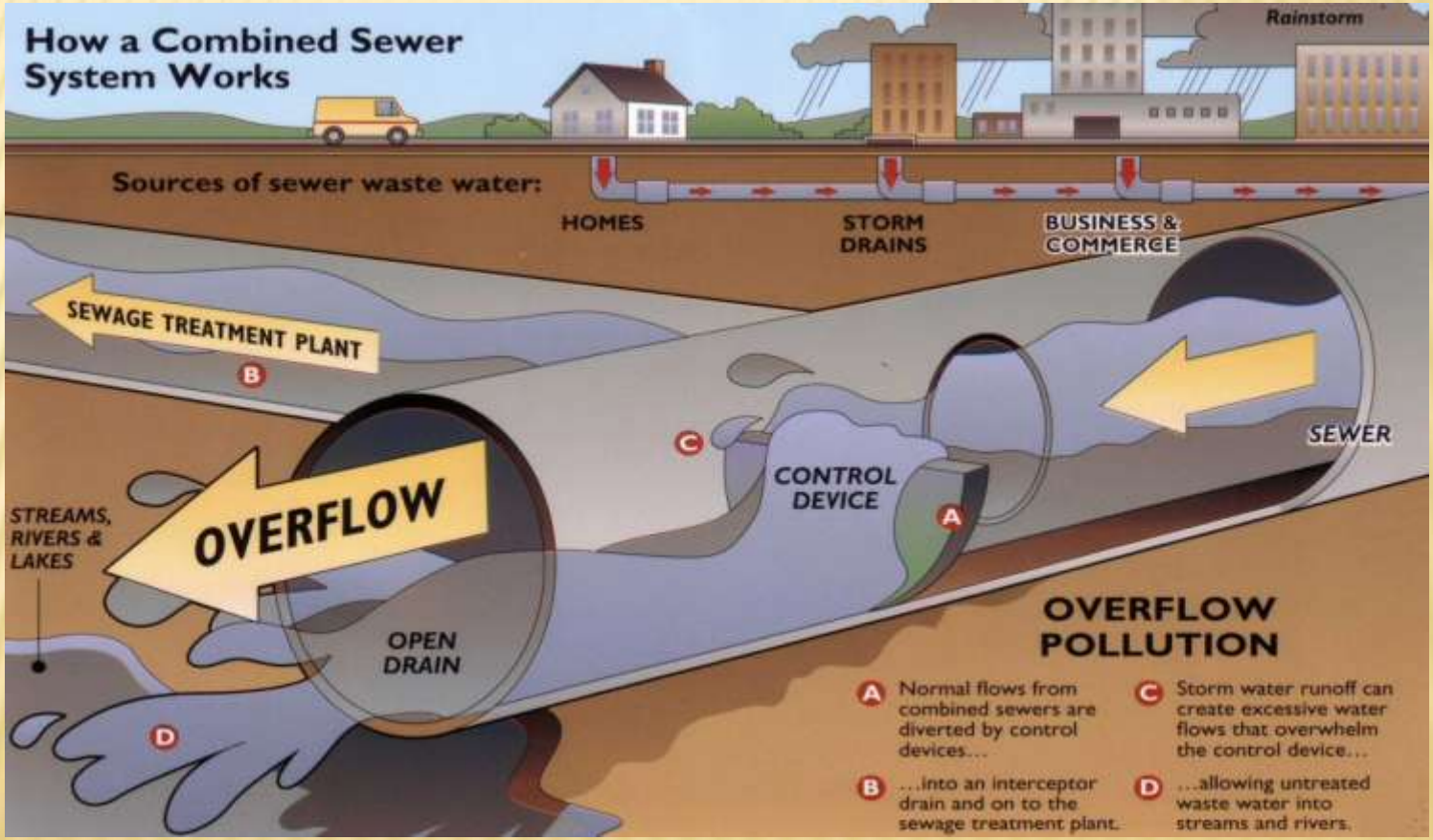
CLIMATE CHANGE EFFECTS_THE MAIN PROBLEM THAT INCREASES PEAK RUNOFF & RUNOFF VOLUMES

THE INITIATIVE

- The problem
- CSO's Requirements of w/w collection systems UWWTD article3 Annex 1 " *Not possible to construct collection systems to treat **all** w/w in unusual heavy rainfall…Members States shall decide on measures to limit pollution from storm water overflows etc*"
- Sea water intrusion : Destroys the infrastructure and creates difficulties for reuse reclamation etc
- Environmental term for Thessaloniki's WWTP :

Dilution factor:**w/w : rainwater (1/7 for the recipient & 1/5 for the WWTP)**

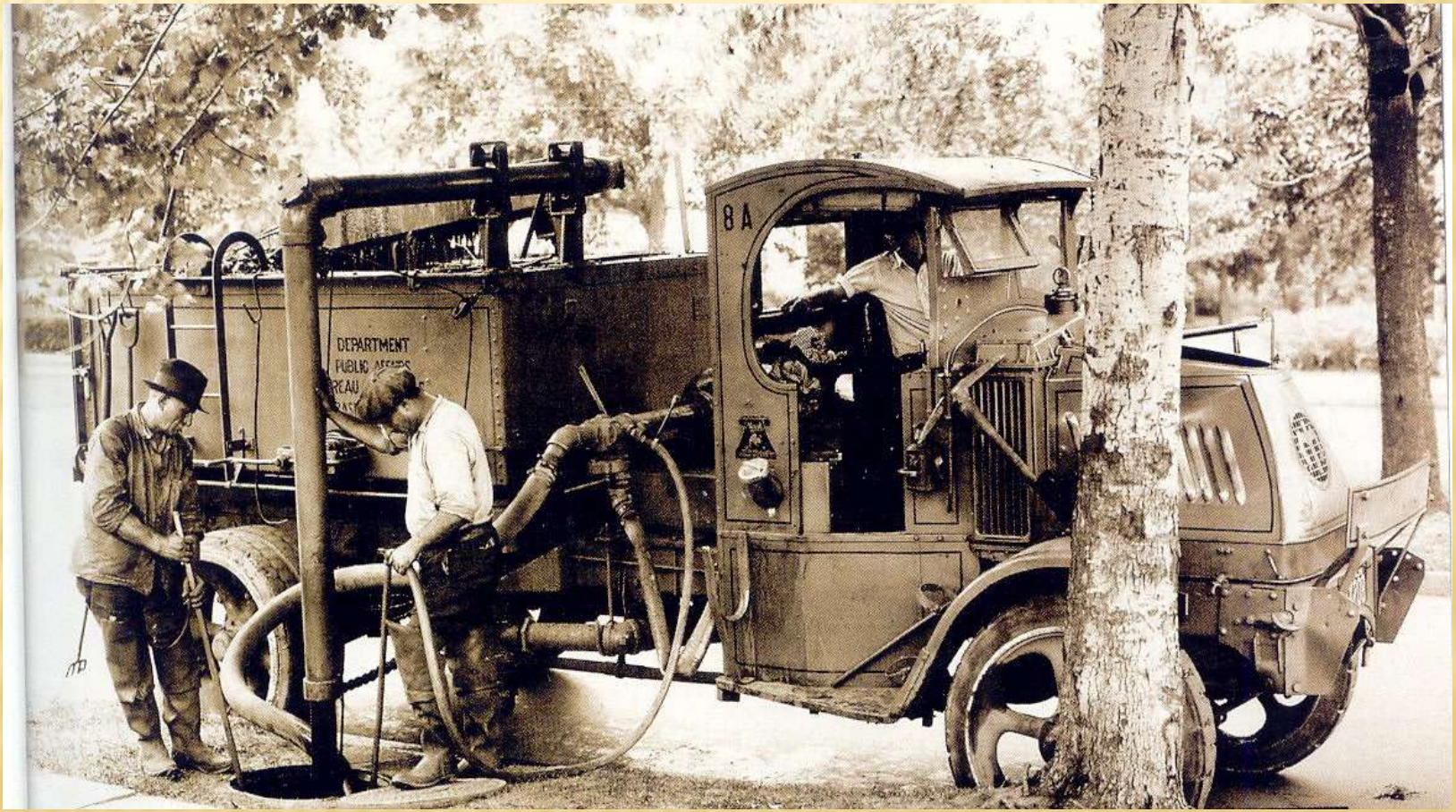
SEWERAGE NETWORK OVERFLOWS



REAL TIME OPERATIONAL CONTROL TOOL OF COMBINED SEWERAGE OVERFLOWS(CSO)AT COASTAL CITIES

- Operational tool with the use of a intelligent agents network .
- Aims in minimizing overflows to the recipient
- Aims in controlling and minimizing seawater intrusion to the sewerage network
- 3 pilot sewerage places with different characteristics will be used for the application(
- It combines classic technologies and daily work's experience with the state of art advanced information ,electronic devices and software

SOME TIME AGO



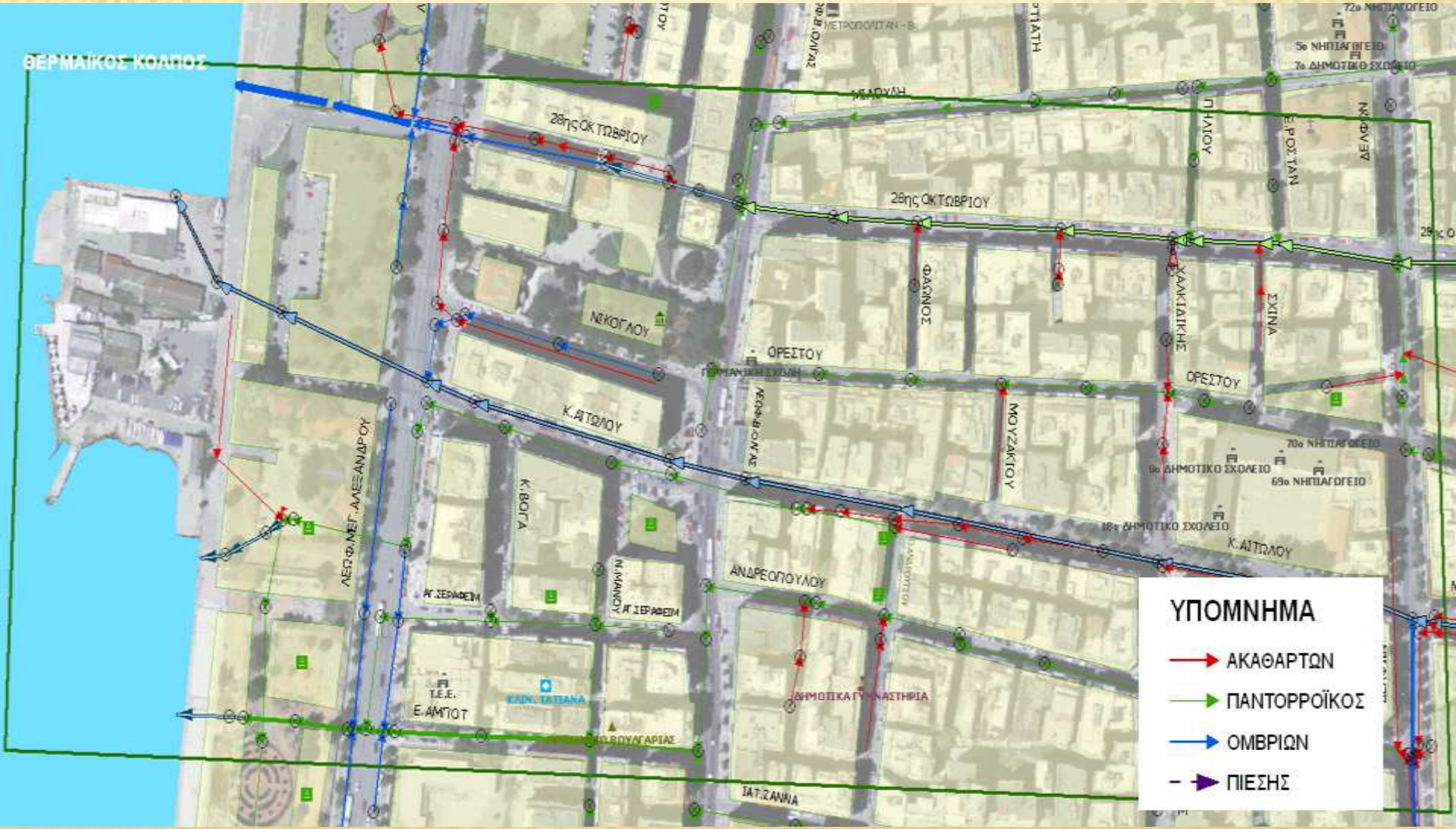
TECHNICAL FEATURES OF THE PROGRAM

- Multi agent system
- System works as a distributed decision making system sending alarms and operating automated gates.
- System controlled and operated from a central station as well as from mobile smart phones
- Operation secured even under network missing conditions
- Remote manual operation
- Local manual operation
- Hand driven local operation
- Extreme conditions overflow operation
- Use of SCADA,GIS etc

AND NOW….

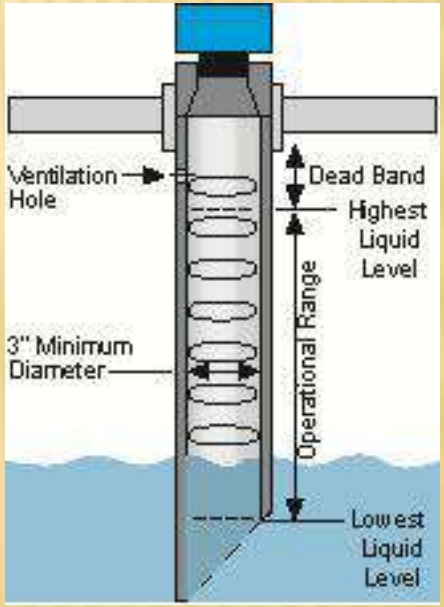
Overflow's Real time "clever eye" at the coastal cities

EYATH'S SEWERAGE NETWORK PILOT CASE AREA NO2

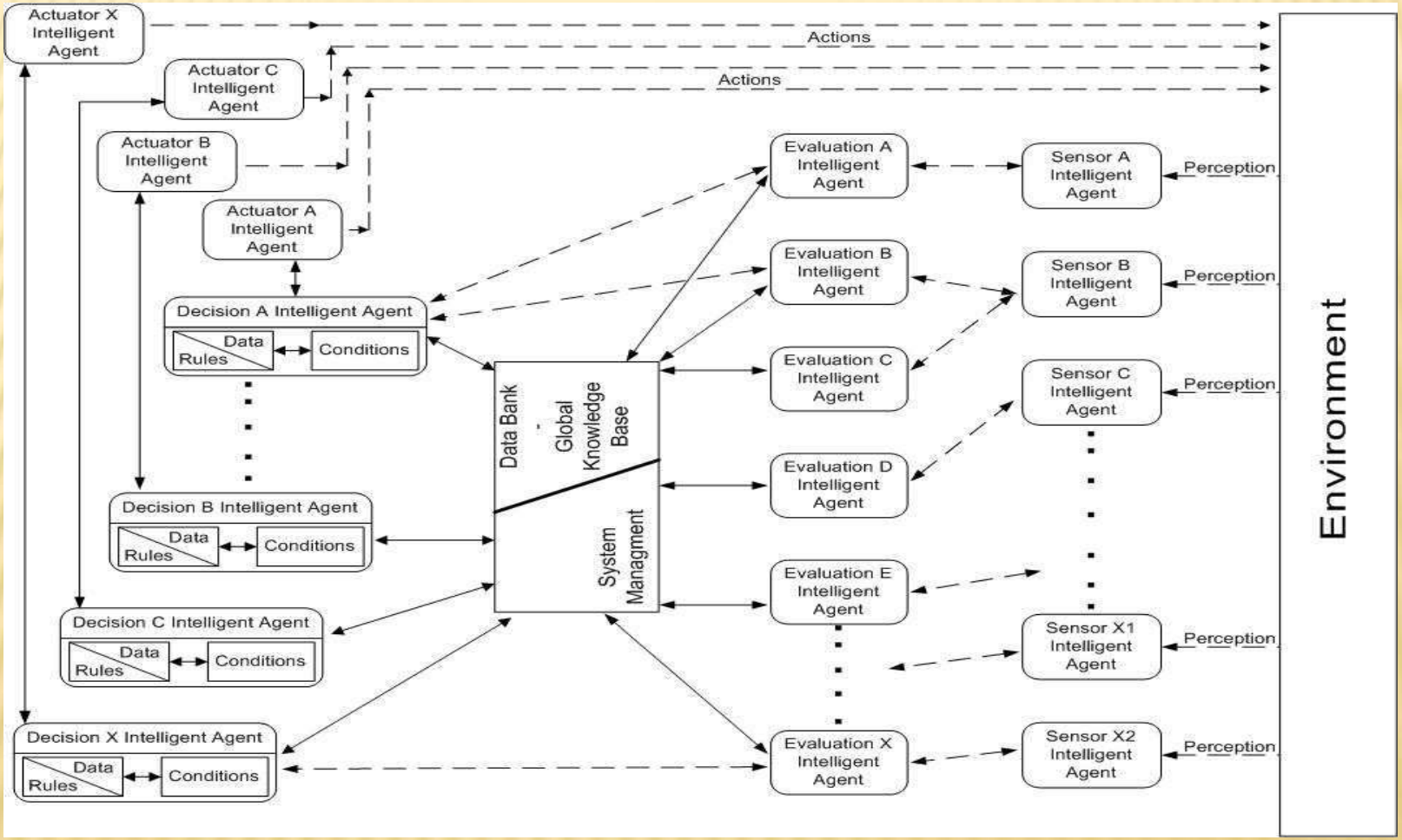



ΘΕΡΜΑΪΚΟΣ ΚΟΛΠΟΣ
Interni
H=9m
H=6.3m
H=6.2m
H=5m
H=6m
H=6.9m
H=8.1m
H=9.2m
H=4.8m

WEATHER AND LEVEL SENSORS

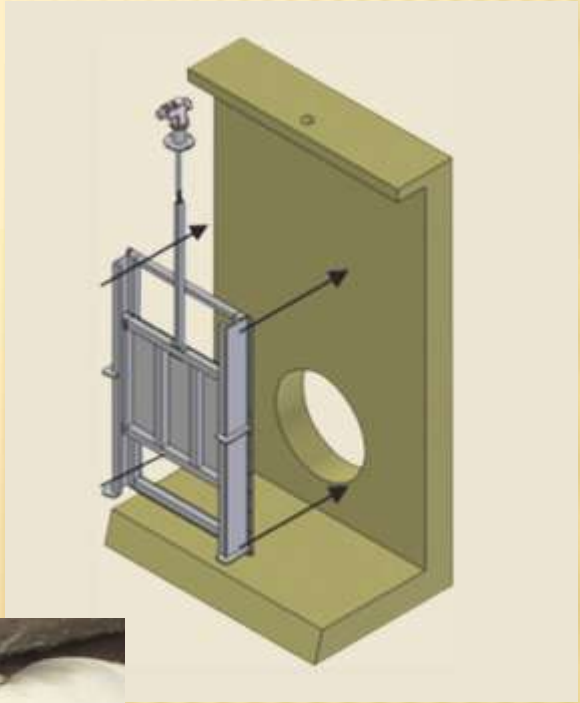


ARCHTECTURE OF THE MULTI AGENT NETWORK



FIELD WORKS

AUTOMATIC GATES INSTALLATION



DELIVERABLES

- Hydraulic & environmental study , very.useful for the sewerage operation's network
- Development and operation of the multi agents system for decision makers
- Development of operational protocols
- Installation of several mechanical tools & software
- Dissemination of the results / contacts with other coastal cities facing similar problems http://realtso.gr

EYATH WILL CARE ABOUT BATHING AREAS WITH OR WITHOUT DIRECTIVES

Thank you

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