



DIGITAL SHIP USA STAMFORD 7° OCTOBER 2009

# AMOS M&P THE EXPERIENCE OF GRIMALDI GROUP

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# The Grimaldi Group

The GRIMALDI GROUP was created in 1946 and today is one of the leader companies in the market of RO-RO, car carrier. The Group has one of the largest fleet in the world of RO-RO / multipurpose and car carrier ships and on all routes served is also very active for transport of container and palletised general cargo. The Group is also specialised in project cargo transport.





# The Grimaldi Group

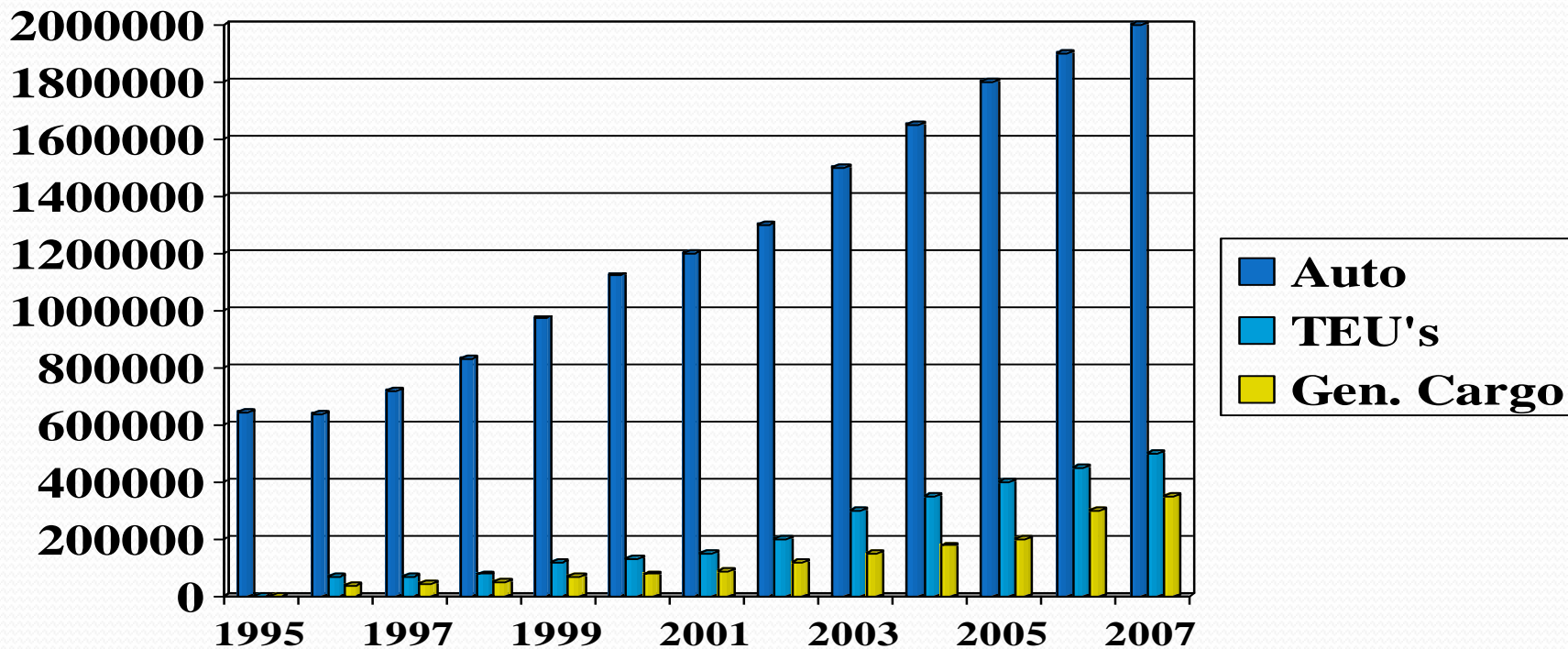
The expansion of Grimaldi out of Mediterranean market started in 1969, with the first regular car carrier line between Italy and United Kingdom. This service, born for the transport of FIAT cars assigned to the English market, has shortly gained the confidence of the major world car manufacturers that decided to use the Grimaldi Group as car carrier for products assigned to the Mediterranean market built in UK and North Europe and vice versa.





# The Grimaldi Group

The Group transports today more than 2 millions of cars and 2.7 million of passenger s per year with 95 owned and 40 chartered vessels .





# The Grimaldi Group

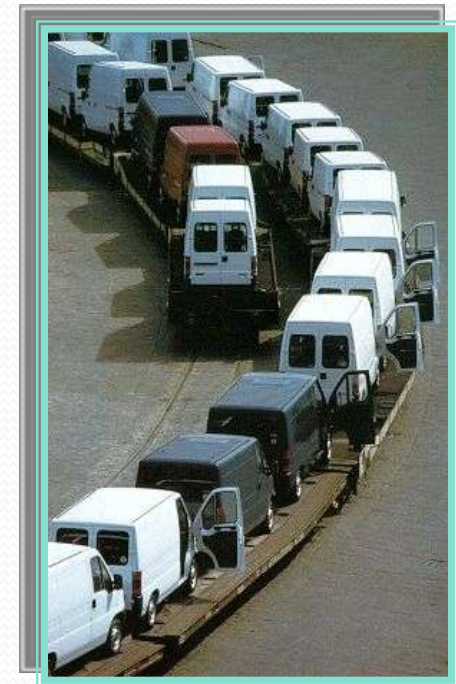
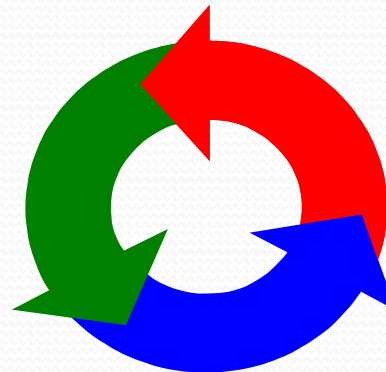
The Group has expanded its activities in order to integrate vertically the services offered by means :

- Application of "door-to-door" concept taking cars from production site and delivering them directly to the dealer;
- Acquisition of port terminal, stock centres for pre delivery checks of cars, truck companies for land transportation of cars in a large number of European and Mediterranean countries



# The Grimaldi Group

Today the Group owns a large network of integrated logistic services in Italy, Spain, Portugal, Denmark and Ireland.





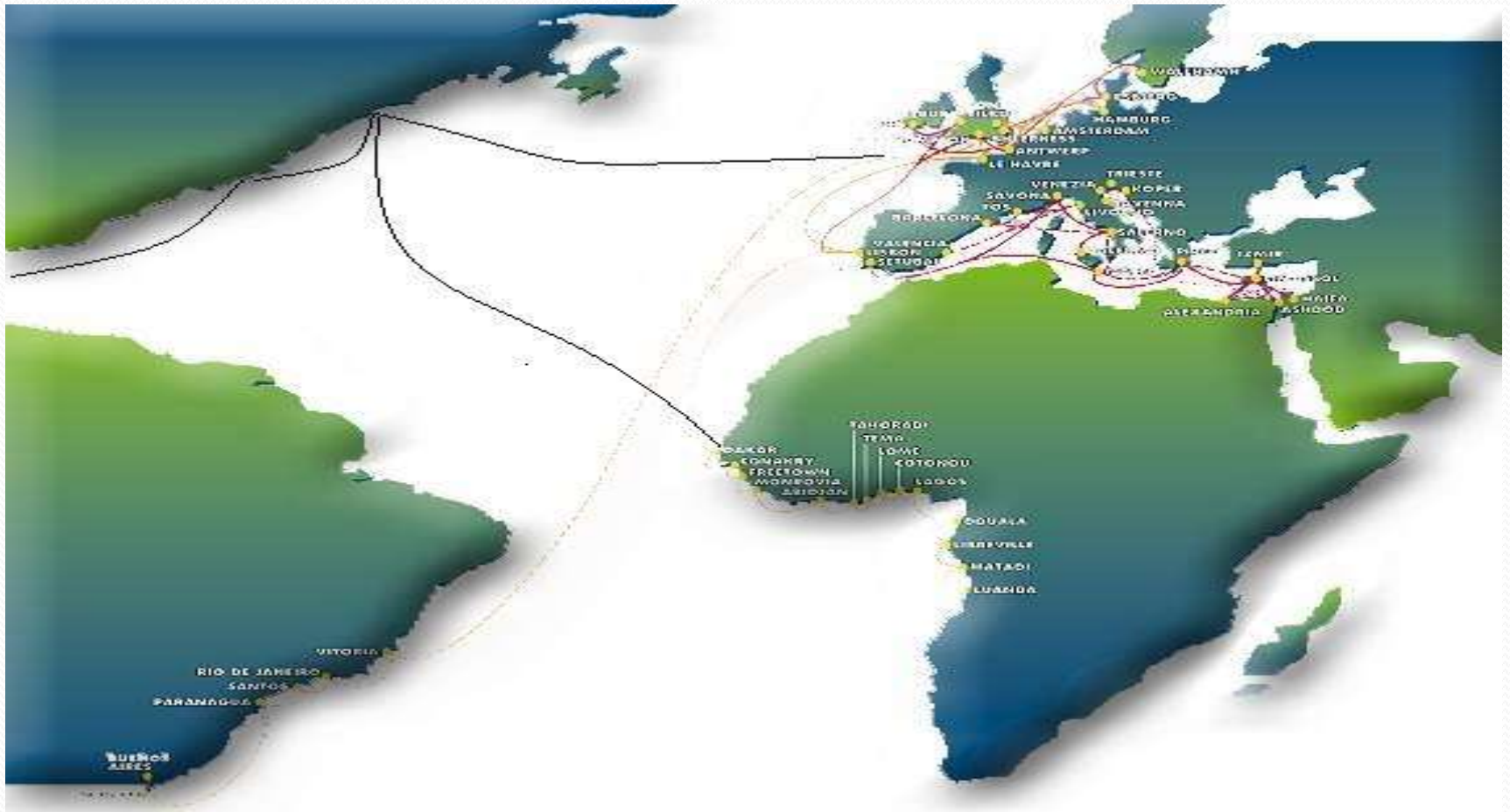
# The Grimaldi Group

The Grimaldi Group has recently made an action of horizontal integration made by acquisition or creation of new Companies going in the sense of development of new routes and expansion in new markets. In fact have been acquired to the Group ACL (Atlantic Container Line), a company trading between North America and North Europe, created Malta Motorways Of the Sea trading into the Mediterranean and is the major shareholder of the Greek Ferry Co. Minoan Lines and of Finnlines a company trading in the Baltic and between Baltic and North Europe.



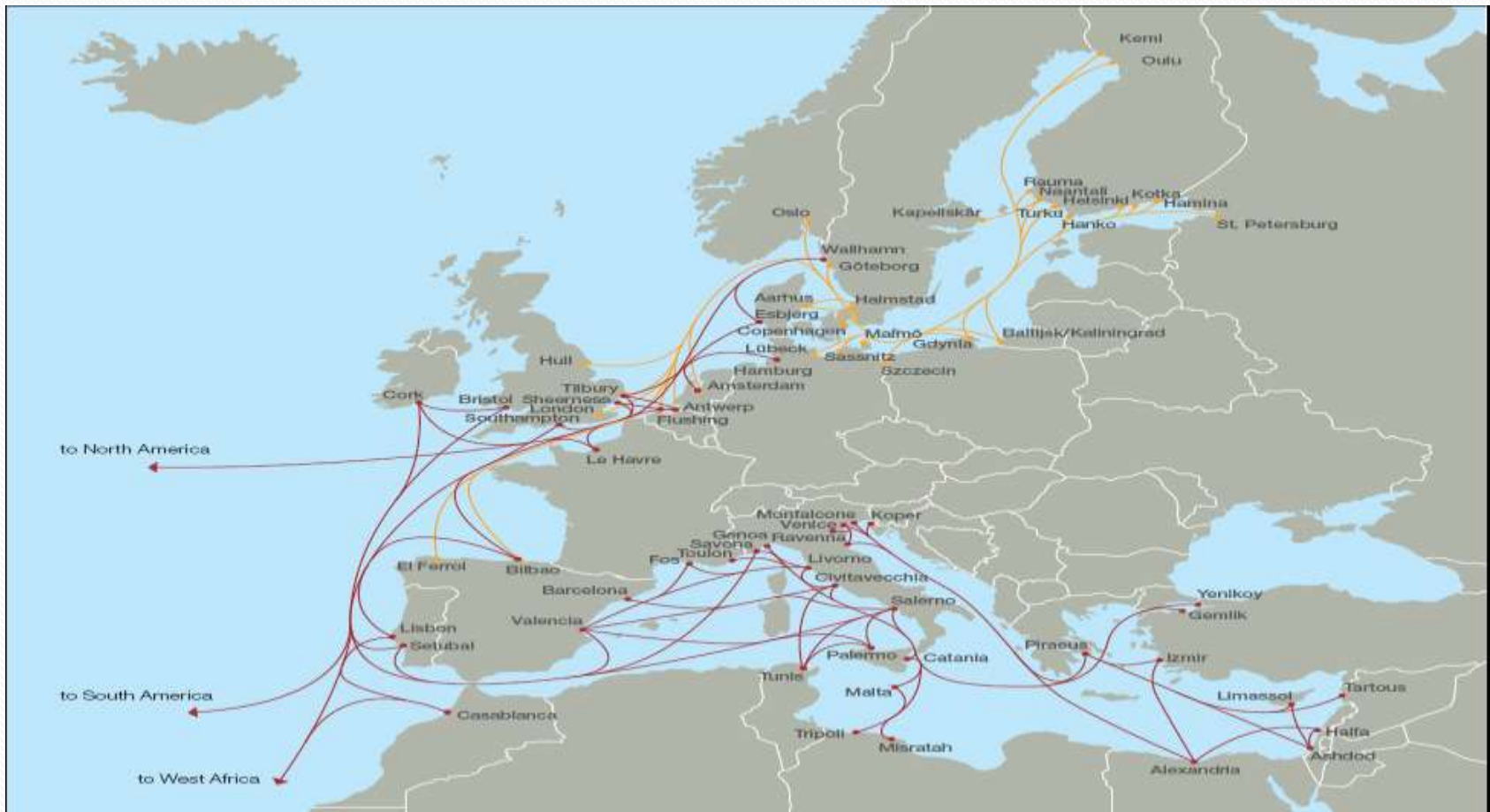


# The Grimaldi Group





# The Grimaldi Group





# The Grimaldi AMOS M&P Project

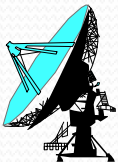
The Grimaldi Group conscious of the importance of new technologies in order to afford the market evolution has developed /utilized some IT applications in the field of fleet management and communication in co-operation with SPECTEC realizing an integrated project that will be described and analyzed in the following .



Maintenance- Stores



Purchasing System-Cost Control



E-Mail, Fax, Telex, Data



## IT TECHNOLOGIES APPLIED TO TECHNICAL AND ECONOMICAL MANAGEMENT OF SHIPS. THE CMMS PROJECT

For transports the quality, readiness, rapidity, regularity and reliability of the service are necessary and vital elements for the customers.

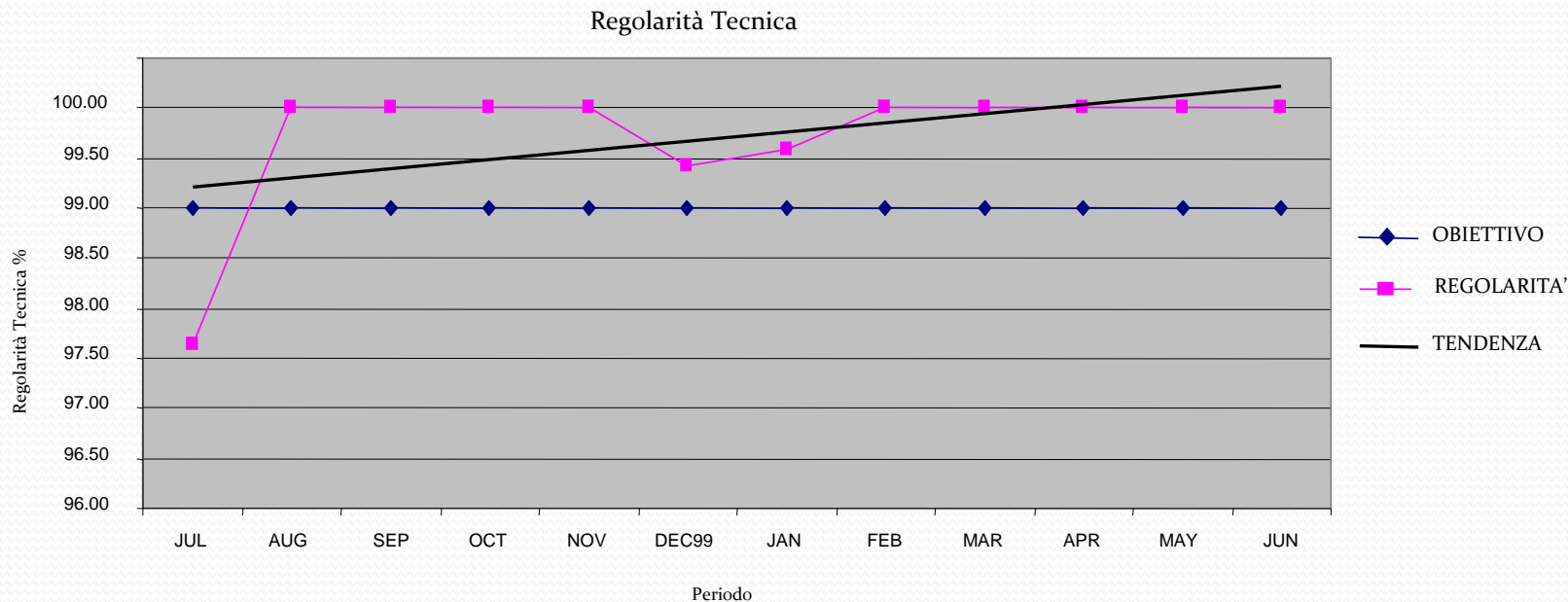
In the case of car transportation by sea, the achievement of market established value of the above mentioned parameters requires, compulsory, technical and organizational standards more adapt to the quality and service level required by the market.

For these reasons the Grimaldi Group decided to adopt for his ships and shore technical office an advanced IT system for maintenance and purchase management in the frame of a more complex project called CMMS (Computerized Maintenance Management System).



## IT TECHNOLOGIES APPLIED TO TECHNICAL AND ECONOMICAL MANAGEMENT OF SHIPS. THE CMMS PROJECT

The objective of the CMMS project was to warrant service levels higher than the minimum required by the market maintaining at the same time low costs in the operation of the vessels in order to get the maximum cost quality ratio.





## IT TECHNOLOGIES APPLIED TO TECHNICAL AND ECONOMICAL MANAGEMENT OF SHIPS. THE CMMS PROJECT

Further advantages that are connected to the utilization of such computerized system is that the data obtained with the system allows the optimization of ships maintenance trough the application of probabilistic and risk analysis. The maintenance optimization could be obtained by means of a balance between expected results and costs based on RAM (Reliability, Availability, Main tenability) objectives summarized in the following two classes:

- Safety objectives (for example for vital systems on board )
- Economical objectives (for example improvement of reliability maintaining safety level avoiding additional costs linked to ships delay)



## IT TECHNOLOGIES APPLIED TO TECHNICAL AND ECONOMICAL MANAGEMENT OF SHIPS. THE CMMS PROJECT

The RAM evaluation is based on methods and techniques of risk analysis applied to the optimization and minimization of costs defined by the ship owner / operator on the base of market requirements. In the following an example of optimal replacement interval equation based on these concepts:

### Optimal Age Replacement Intervals

Goal: find  $t_R^*$  minimizing the following function:

$$C(t, t_R) = C_o M_o(t, t_R) + C_1 M_1(t, t_R)$$

$M_o(t, t_R)$  = expected number of non failed parts replaced in (o,t)

$C_o$  = cost of preventive maintenance

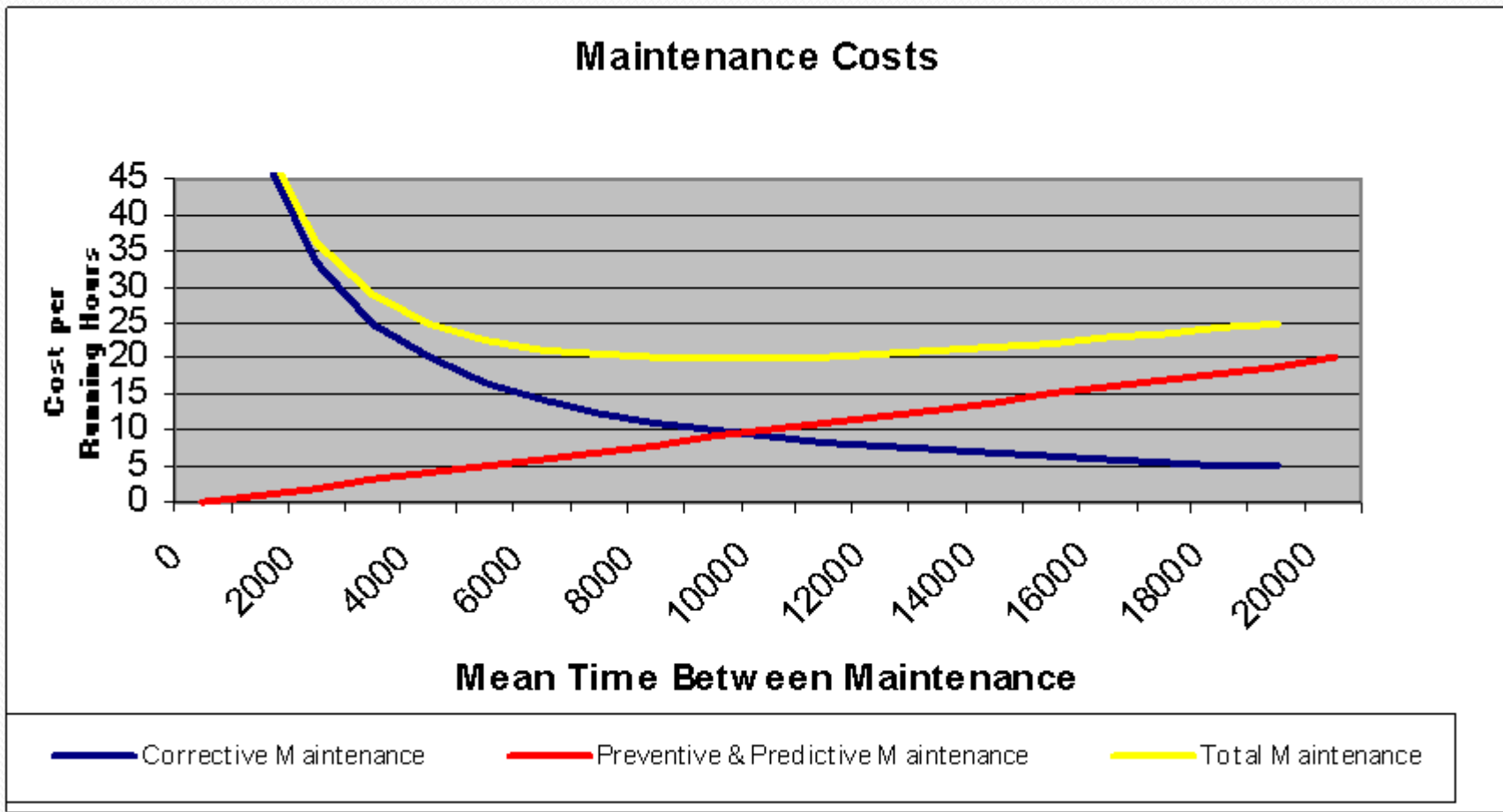
$M_1(t, t_R)$  = expected number of failed parts replaced in (o,t)

$C_1$  = cost of corrective maintenance

$t_R$  = maintenance (replacement) interval



## IT TECHNOLOGIES APPLIED TO TECHNICAL AND ECONOMICAL MANAGEMENT OF SHIPS. THE CMMS PROJECT





## IT TECHNOLOGIES APPLIED TO TECHNICAL AND ECONOMICAL MANAGEMENT OF SHIPS. THE CMMS PROJECT

The development of the CMMS project has been based essentially on the application of preventive maintenance concepts. This type of maintenance allows to obtain several advantages as:

- Planning of maintenance tasks at right time without influencing ships availability;
- Reduction of incidence of maintenance on failure only to random event reducing at minimum the unscheduled vessels stops maintaining the service level objectives;
- Effective and efficient purchasing and store management on board with a consequent reduction of maintenance costs.



## THE GRIMALDI AMOS PROJECT IN NUMBERS

The Grimaldi Group AMOS project in numbers is :

- N° of ships managed by AMOS system 45
- N° of ship to be managed by AMOS system 22 (retrofit) + 25 (new buildings)
- Office data base (actual dimension) 5 GB
- Typical ship data base 40 MB (Average value)
- Number of Purchase Order per year 25,000 (actual)
- Average number of managed spare parts per ship 10,000
- Average number of managed consumables articles 12,000
- Average N° of AMOS MAIL messages exchanged per ship and year 30.000



## THE GRIMALDI AMOS PROJECT - THE RESULTS

### QUALITATIVES RESULTS

- Complete management of total maintenance process;
- Centralisation and availability ashore of all vessel data;
- Possibility of specific maintenance data analysis, vessel bench marking;
  
- Reduction of lead time, order issuing costs, easy invoice control;
- Stock and inventory control, spare parts trace ability, consumables control;
- Efficient and effective cost control and budgets management;



## THE GRIMALDI AMOS PROJECT - THE RESULTS

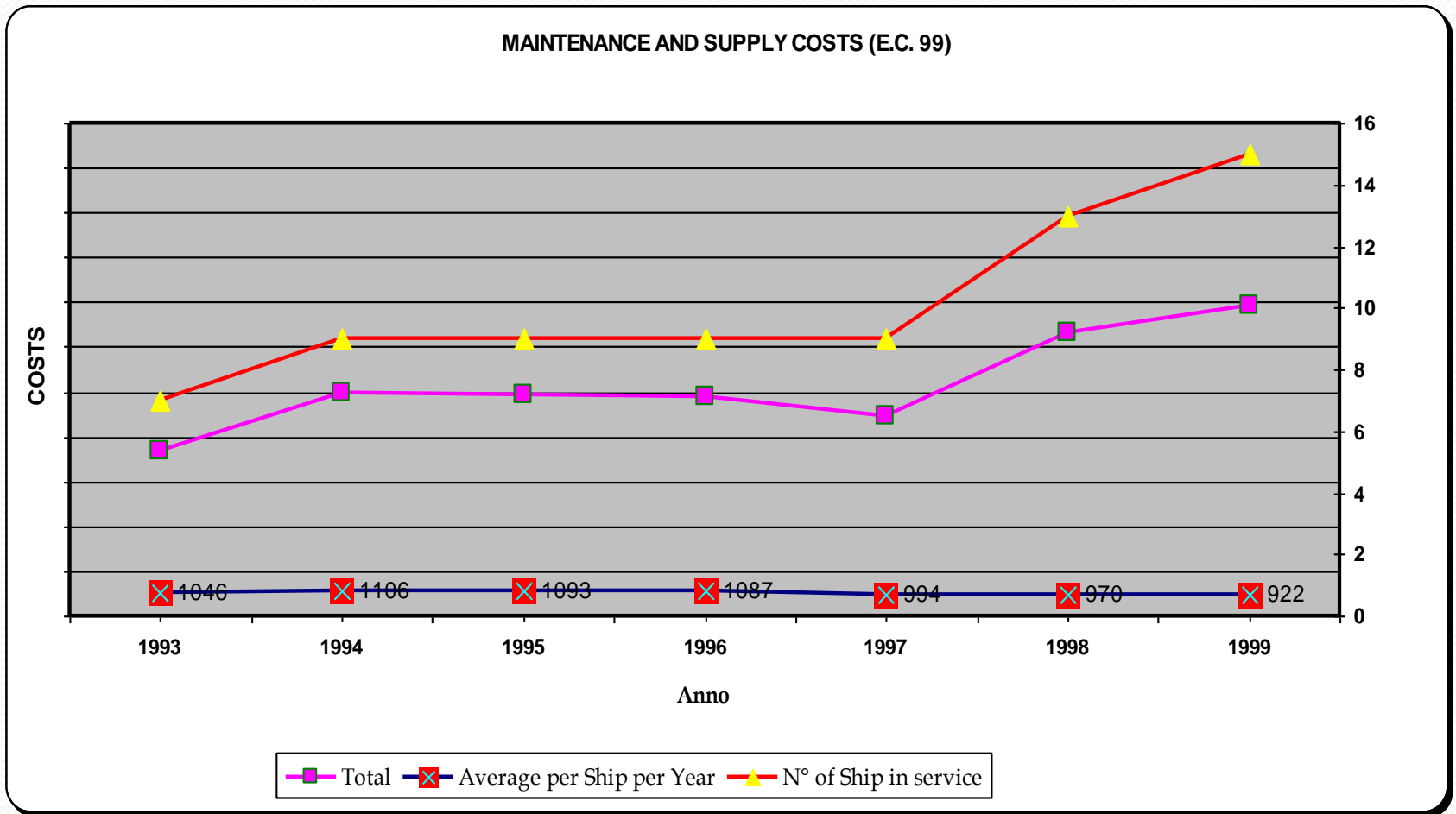
### QUANTITATIVES RESULTS

Maintenance and Purchasing costs reduction as follows:

- 8.5% first year
  - 2.5% second year
  - 5% third year



## THE GRIMALDI AMOS PROJECT - THE RESULTS





## THE GRIMALDI AMOS PROJECT - THE RESULTS

The reason why the shown results were reached are in our opinion well represented in the following “Key Factors”:

- The commitment of Grimaldi Group management in the adoption of CMMS
- The assignment to dedicated people of this project ( a new function was created in the Company);
- The integration of CMMS with the Company Accounting and Financing system with the consequent reinforcement of Cost Control capabilities;
- The continuous research of process improvements;
- Personnel training;
- The support supplied by SPECTEC in the development of a complex project with complex customizations



## THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

In order to monitor the complex ship management process and measure the benefits reached with the implementation of the CMMS system, together with the implementation of efficient and effectiveness policy it has been necessary also to define a series of indicators that exactly describe the performance that is necessary to monitor. The data to build the indicators can be extract from the system and are generally known as

# Key Performance Indicators

In the following some examples of these indicators that are used in the Grimaldi Group ship management functions



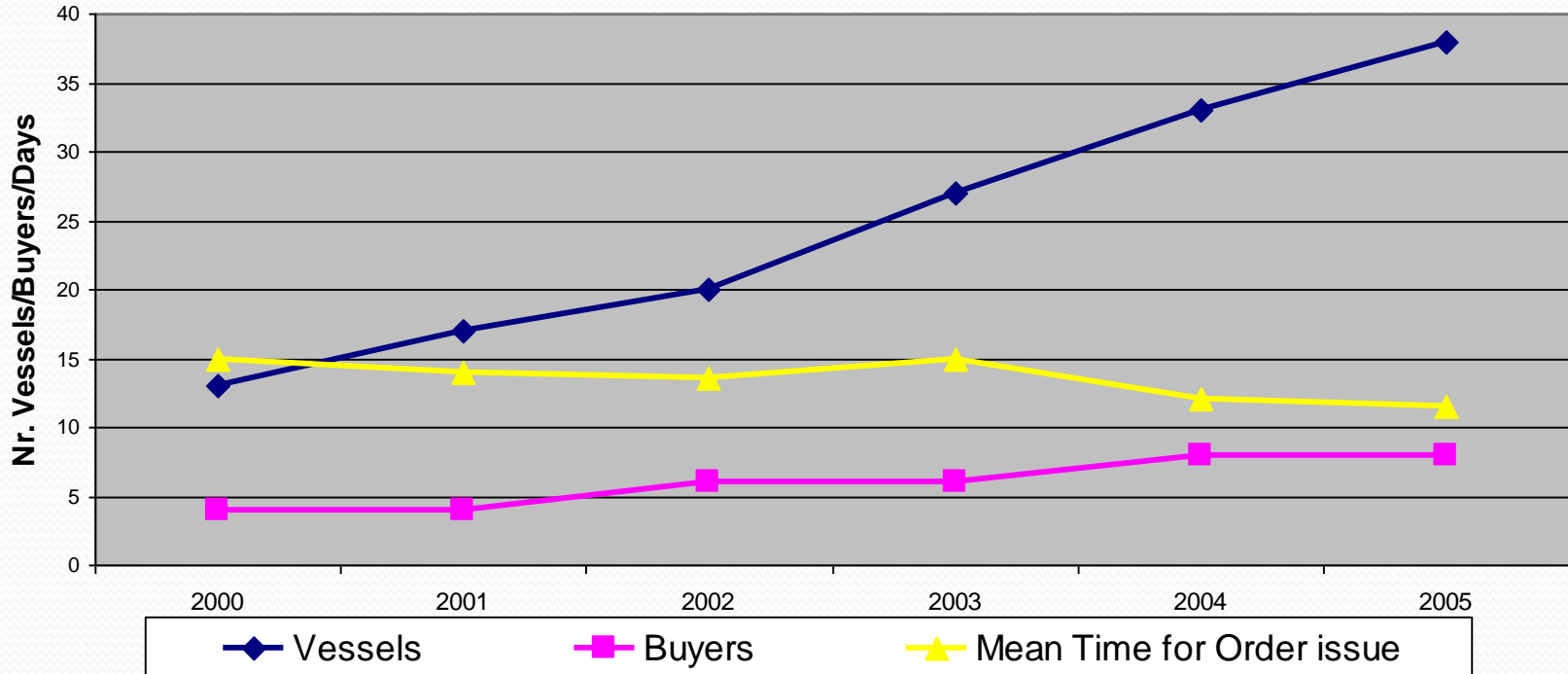
## THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

The following Data are extracted from the Grimaldi Group CMMS and are relevant to a fleet 45 vessels composed by Ro-Ro, Ro-Ro Multipurpose, Car Carriers and Pax Ferries



## THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

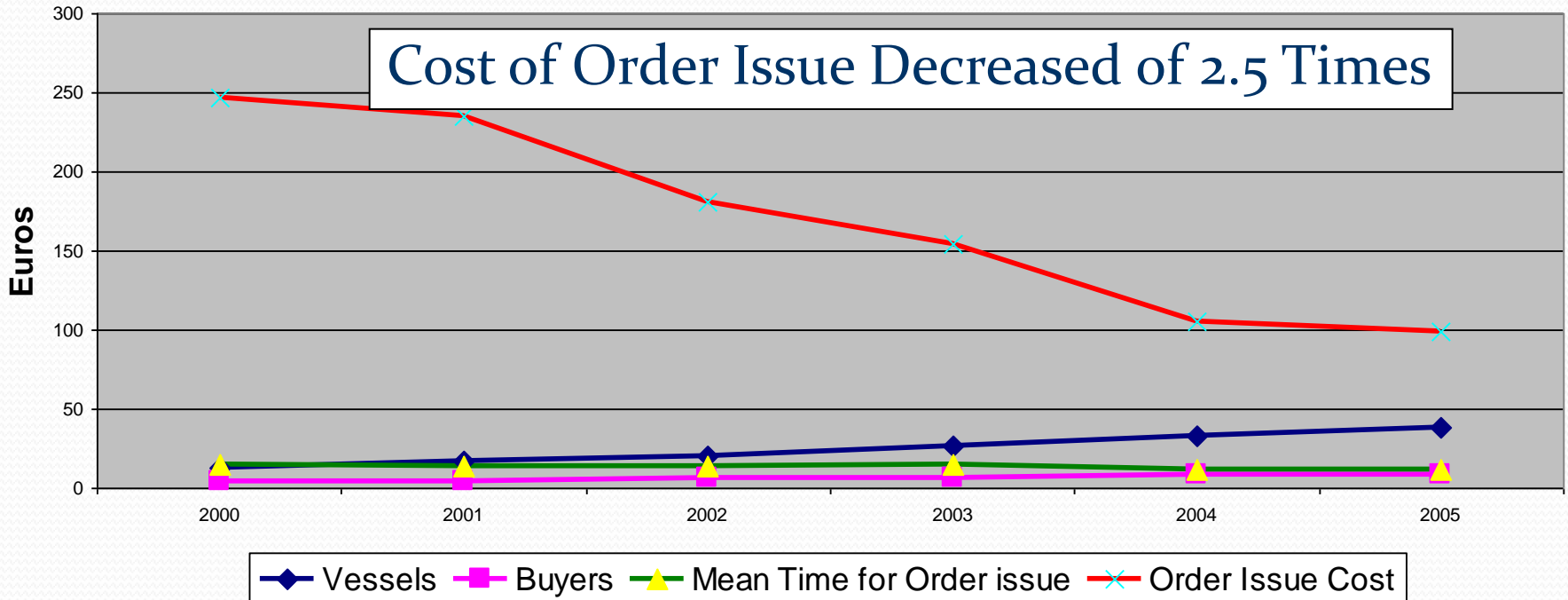
N°of Vessel, Mean Time Between Order Issue, N°of Buyers





# THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

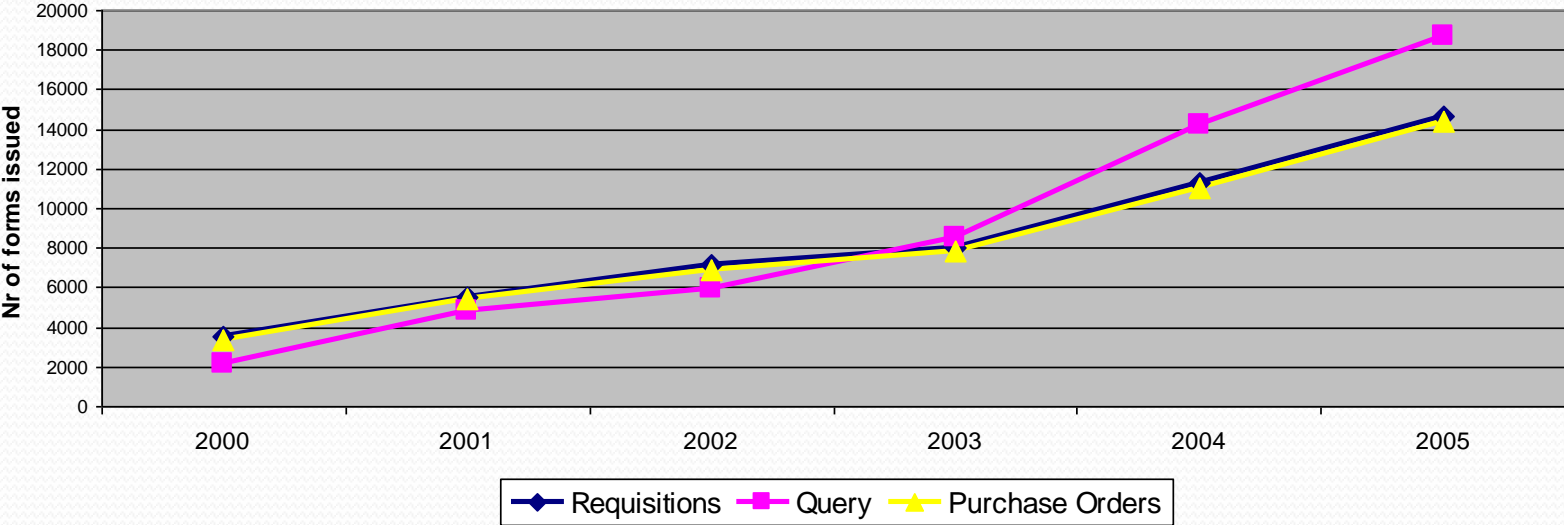
Cost of orders - trend





# THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

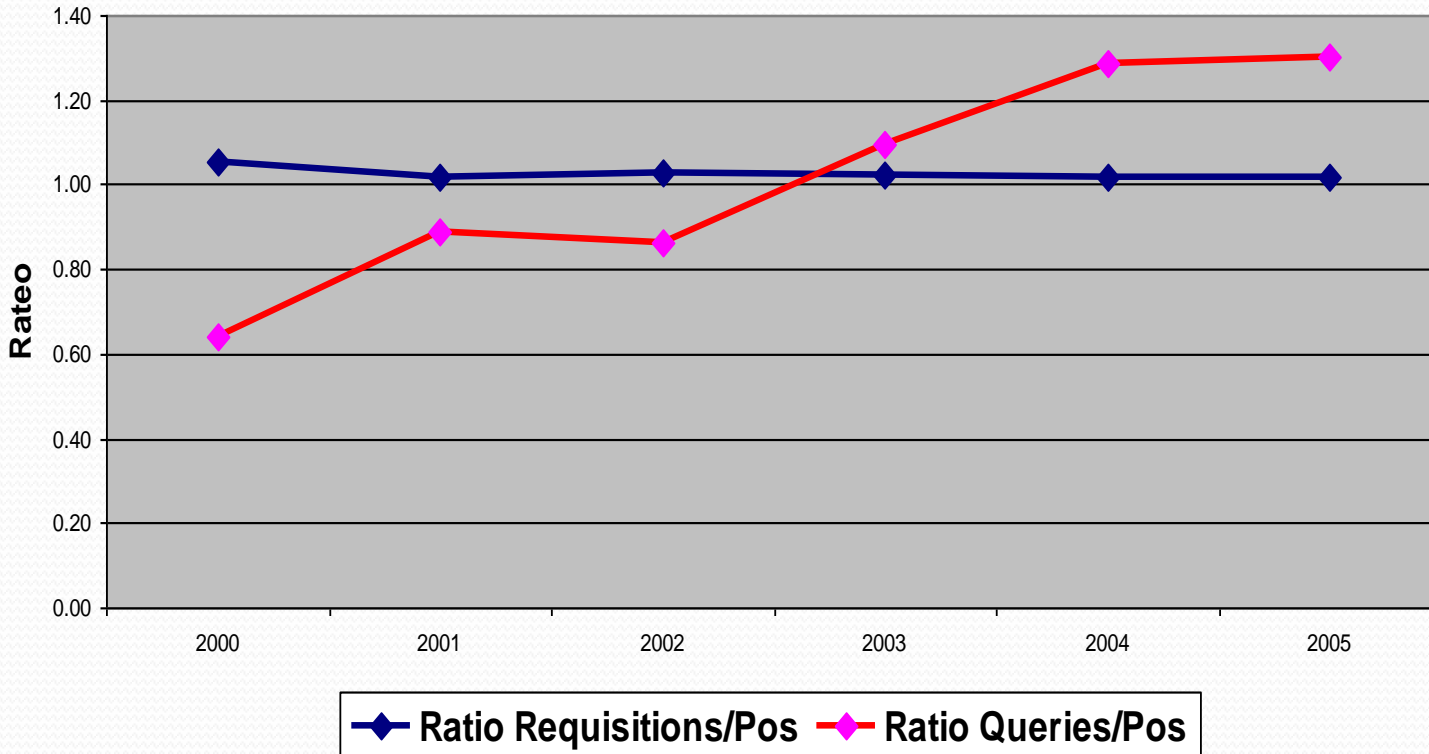
Purchasing Forms





## THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

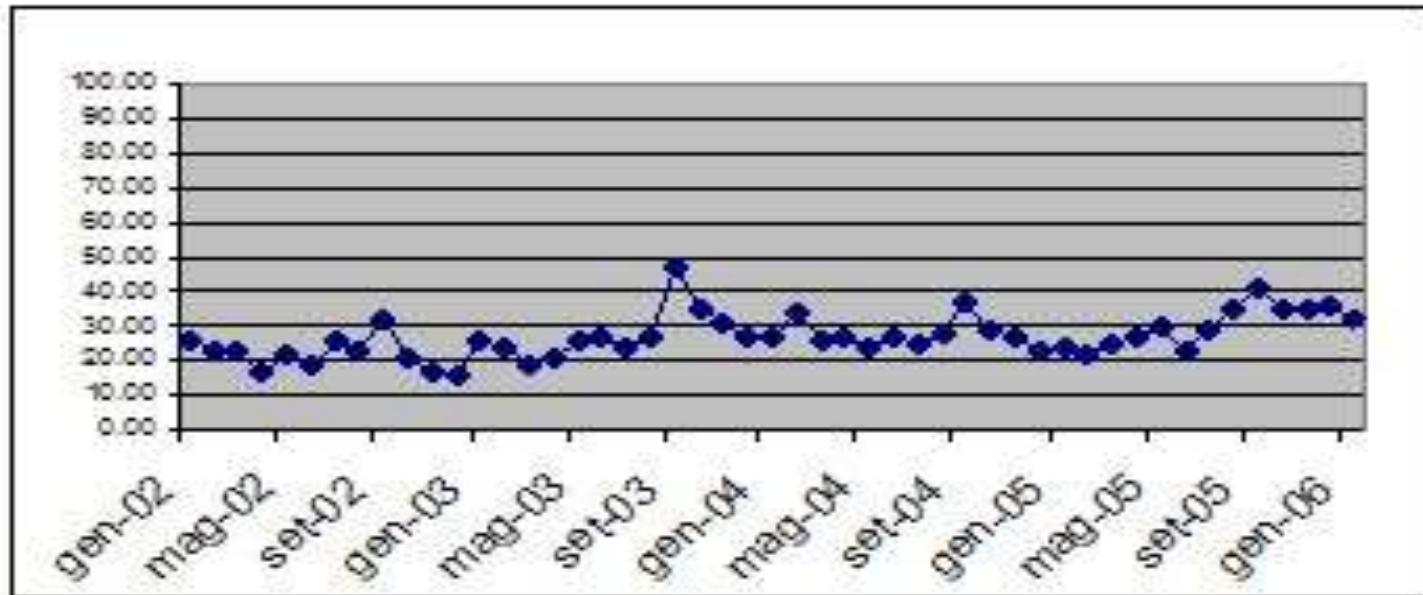
Ratios





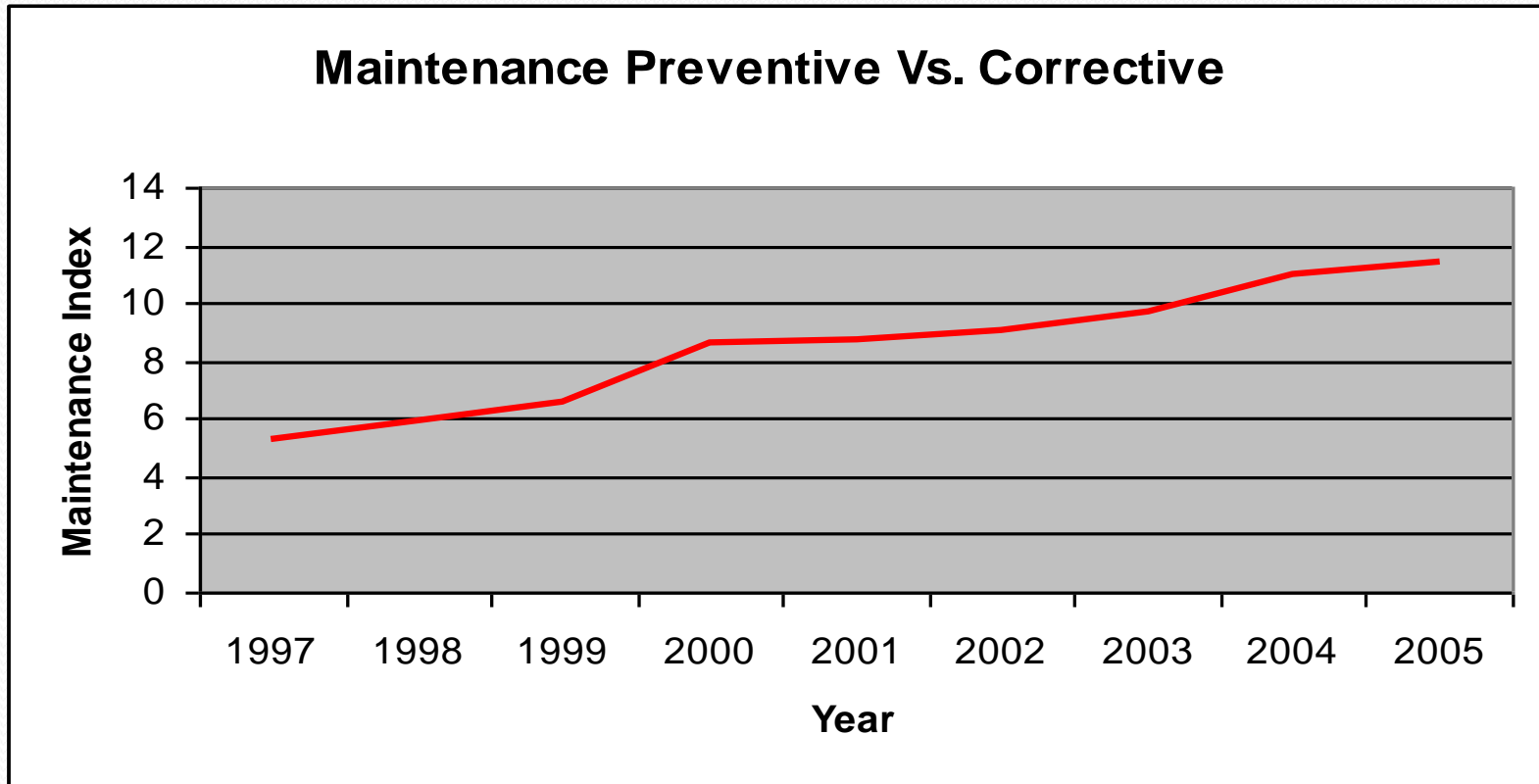
## THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING

Invoice Control Time





## THE GRIMALDI AMOS PROJECT – THE PROCESS MONITORING





## THE GRIMALDI AMOS PROJECT – THE FURTHER IMPROVEMENTS

The improvements made to the CMMS introduced later on in the system are essentially utilization of E-Commerce capability. The implementation of these capabilities allowed:

- The optimization of procurement functions by the direct link of the AMOS system to Internet;
- Send directly to specialized portal the requisition and the orders created into the system, and receive back automatically the quotations

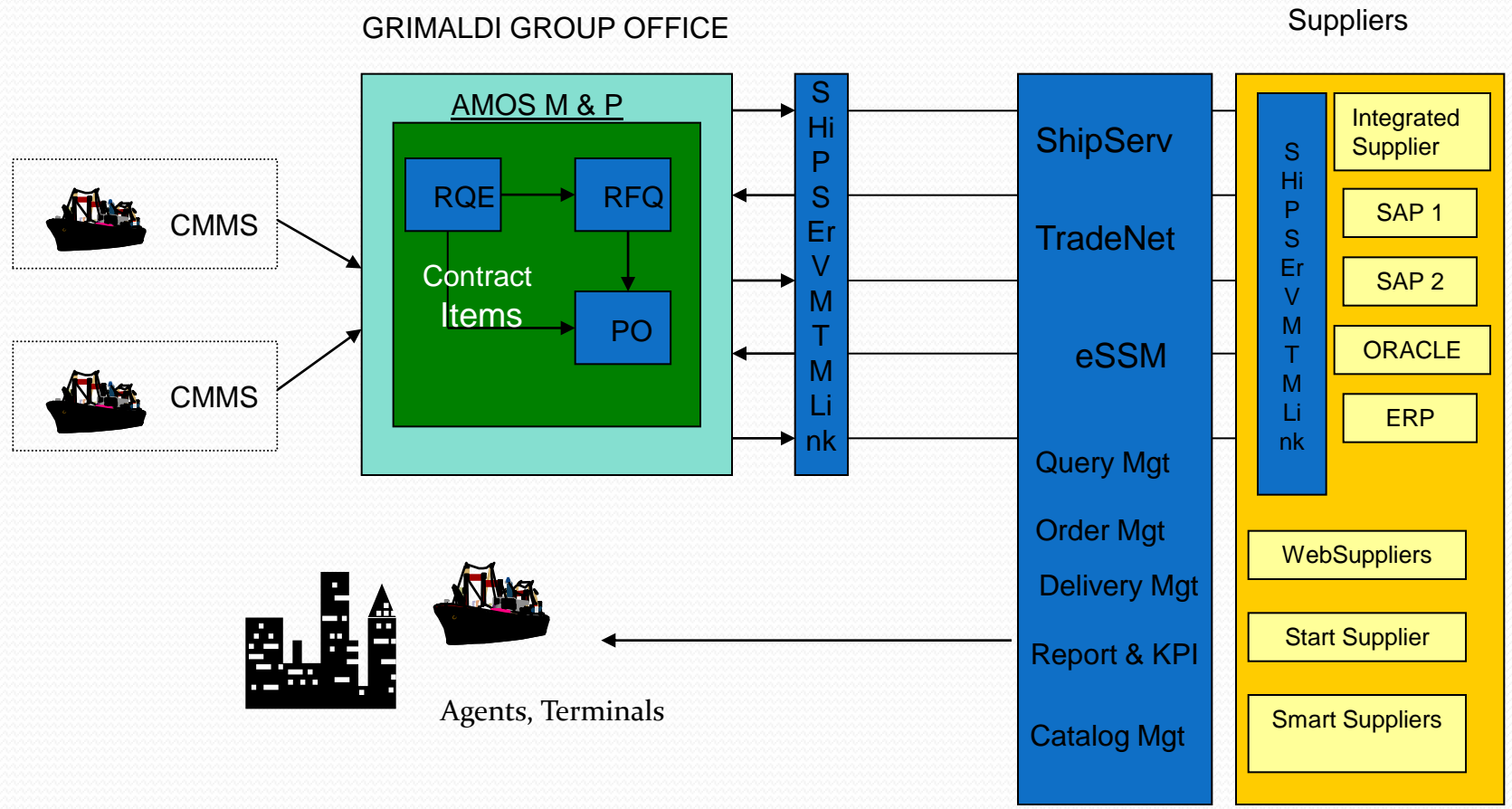


CMMS





# THE GRIMALDI AMOS PROJECT – THE FURTHER IMPROVEMENTS





## THE GRIMALDI AMOS PROJECT – CONCLUSION

Only companies capable of managing data as a strategic resource and investing in data quality can improve their profitability and efficiency and the use of these information for strategic planning will impact their overall business result positively.

In the ship technical management the limited visibility of what is spent and why across the fleet can have a relevant economical impact. Without high quality usable and electronic data, KPI, benchmarking, inefficient processes remain unchanged, causing vessel operating costs to be higher than necessary.



**THANK YOU FOR ATTENTION  
ANY QUESTION?**

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