PART 1
RINA Marine Digital Strategy
RINA is a global firm of consulting engineering and compliance services

- X5 in 15 years
- 170+ Offices
- 65+ Countries
- 3,700 Colleagues

LEVEL OF RINA PRESENCE:

- low
- high

SUSTAINABILITY

PEOPLE

DIGITALIZATION

MARINE  ENERGY  T&I  INDUSTRY  BUSINESS ASSURANCE
### Digital Transformation...there is no coming back

<table>
<thead>
<tr>
<th>95%</th>
<th>50%</th>
<th>80%</th>
<th>-200X</th>
<th>-400x</th>
</tr>
</thead>
<tbody>
<tr>
<td>95%</td>
<td>50%</td>
<td>80%</td>
<td>-200X</td>
<td>-400x</td>
</tr>
<tr>
<td>New product will contain IoT</td>
<td>Large industrial companies will use digital twins</td>
<td>Companies with completely digital value chain</td>
<td>Cost of drones</td>
<td>Cost of 3D printer</td>
</tr>
</tbody>
</table>

#### Key Statistics

- **75Bn Connected devices**
- **20% Large corporations using Augmented Reality**
- **x57 Forecasted growth of AI market**
- **60Mn app**
- **1Tn$ Blockchain Spending**
The world’s most valuable resource is no longer oil, but data
A transformation rather than a revolution: not ‘if’ but ‘when’ it will happen
Shipping technology has always trailed in the wake of other more innovative industries
And see what happened to one of the frontrunners... automotive sector

Should I choose a car for its engine, or for its processor?

But... do I need to buy a car?
Pressure in the shipping industry... coming from supply chain players
…and across Lifecycle Asset ..
Shipping ecosystem: thinking the ship as a computer that navigates
It takes two: smart ships, smart people

Technical Human Excellence

Cutting-Edge Digital Technologies

From data ...to Value
What is RINACube?
...imagine the control room of the future... it’s just the starting point
### Managing complexity: The digital platform is a matter of business value

<table>
<thead>
<tr>
<th>Metric</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo volumes handled</td>
<td>+5%</td>
</tr>
<tr>
<td>Lubricant procurement costs</td>
<td>-10%</td>
</tr>
<tr>
<td>Carriers’ profitability</td>
<td>+3% +5%</td>
</tr>
<tr>
<td>Operating Expenditure</td>
<td>-40%</td>
</tr>
<tr>
<td>Revenue Increase</td>
<td>+10% +15</td>
</tr>
<tr>
<td>Active port time</td>
<td>-30%</td>
</tr>
<tr>
<td>Forecasting accuracy</td>
<td>+/- 10%</td>
</tr>
<tr>
<td>Shipbuilding cost</td>
<td>-15% -20%</td>
</tr>
</tbody>
</table>
RINACube is a first step for a connected marine ecosystem.
RINA Digital Ship - new Additional Class Notation

- Assigned to ships fitted with navigation & machinery automatic data collection system and transmission to shore
- Ship continuously monitored according to a set of parameters, filtered to remove anomalies
- Data collection system surveyed yearly via a remote connection to RINACube platform
- Vast benefits expected from accurate data management (measuring the effects of a refitting, monitoring different aspects of ship performance, efficiency and payback; measuring the level of hull and machinery degradation…)
World Will Never be as slow as it is today.
PART 2
Digitalization in maritime transport
European Commission: digitalization of EU maritime transport

“To ensure competitiveness and efficiency of EU maritime transport sector it is necessary to reduce the administrative burden on ships and facilitate the use of digital information with the aim of improving the efficiency, attractiveness and environmental sustainability and contribute to the integration of the sector to the digital multimodal logistic chain”

- Data Sharing
- Data Exchange
- M2M

Defined & Univocal
- Data Set
- Data Format
Obligation for Member States to establish National Single Windows, reporting formalities (RFD) from ships in a single electronic submission.

The EC funded several initiatives to facilitate its implementation. Some TEN-T/CEF Actions were participated by RINA as Implementing Body of MIT:

- Development of a pilot for an interoperable ICT Platform to interface ICT systems (MSW, port community systems…)
- Support to Member States to implement a common framework, possibly connecting national MSW to national logistics platforms
- Pilot actions aimed at preparing and adapting business communities and port authorities systems to the Directive
**Directive shortcomings**

Unclear definition of data format and data requested by national authorities. EC REFIT evaluation in 2016 → RFD objectives not attained / partially attained

**Actions towards a harmonized EU Maritime Single Window**

- Fully harmonize the interfaces available to ship operators
- Provide information in the same way and same format across the EU
- Standardize max data set for the management of port / terminals to ensure single submission. Data already provided to authorities should not be required again
Sea Traffic Management (STM)

**Target:** connecting efficiently the maritime sector through real time data exchange and information sharing among ships, service providers and shipping companies (STM is inspired by Air Traffic Management)

**STM Validation Project** (nearly completed): Nordic Region + Mediterranean
- Put in practice theoretical results of previous EU R&D through large-scale test beds
- Perform STM Services (Route optimization, Ship-to-ship route exchange, Port call synchronization…)

**RINA** mainly focused on experimentation / validation of e-certificates, assessing the information needed and exchanging e-certificates with Costa Crociere. Possibility to share e-certificates with other stakeholders through ICT STM Infrastructure
e-Certificate

Issued by RINA, as Class and RO, according to IMO FAL5 / Circ.39
Validity: verification through RINA validation site (https://ecertificate.rina.org)
Truthful e-document that can replace its paper version (both versions can not coexist)
Could be extended to other e-documents, to reduce the Administrative burden

Criticality for a widespread use of e-certificates
Guarantee that any e-certificate issued on behalf of an Administration is accepted by other Flags and their Coast Guards during the port calls
PART 3
RINA approach to the classification of Unmanned & Autonomous vessels
- Required technology is already available
- Fast development of technologies based on machine learning and artificial neural networks
- Aviation and automotive sectors are forerunners
Aimed at providing technical background to achieve defined safety levels, allowing Flag Administrations to issue a “permit to operate” safely (ship + environment)
RINA approach

- Innovative aspects developed as goal-based standards
- Each goal developed up to an appropriate level, depending on maturity of technology and prescriptive regulations
- Coverage of all safety issues (as applicable):
  - Structures & stability
  - Machinery
  - Electrical & automation
  - Fire protection & escape
  - Life-saving appliances
  - Navigation & communication (including COLREG)
### Autonomous levels codification

<table>
<thead>
<tr>
<th>Autonomous Levels</th>
<th>Local control capability</th>
<th>Remote control capability</th>
<th>Local and remote control capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Automation</td>
<td>Level 0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conditional Automation</td>
<td>Level 1 (L)</td>
<td>Level 1 (R)</td>
<td>Level 1 (L+R)</td>
</tr>
<tr>
<td>High Automation</td>
<td>Level 2 (L)</td>
<td>Level 2 (R)</td>
<td>Level 2 (L+R)</td>
</tr>
<tr>
<td>Full Automation</td>
<td>Level 3 (L)</td>
<td>Level 3 (R)</td>
<td>Level 3 (L+R)</td>
</tr>
</tbody>
</table>
Automation / Autonomous systems

- Designed to allow the required level of autonomy
- Providing all necessary information to a centralized control station, aboard / ashore
- Duplicated, tolerant to single failure and to specified casualty threshold (e.g. fire, flooding)
- Decisional software validated by Class for environmental awareness, autonomous sailing and ship’s management
- Information available to the Human Operator (HMI), inspired by the One-Man Bridge criteria
Main challenges of autonomous ships

- Define International and National juridical status
- Define responsibility and liabilities
- Harmonize data exchange and inspection regime
- Develop training and qualification standards
- Validate technological solutions
RINA Digital Transformation

Via Corsica, 12 - 16128
Genova | Italy
P. +39 010 53851 | info@rina.org
rina.org

The new Rembrandt