



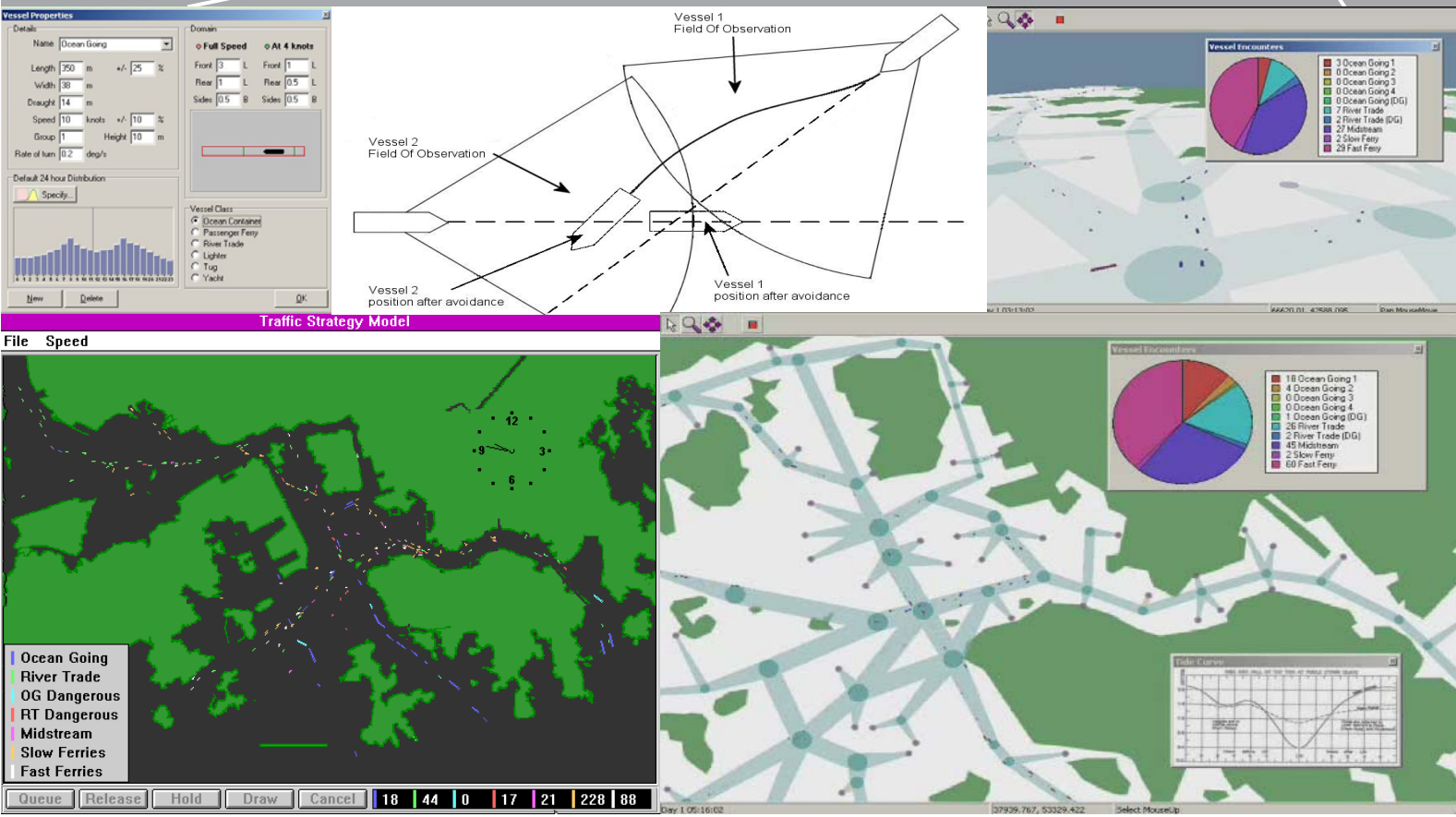
# marine risk & navigational modelling



**ROYAL HASKONING**

thinking in  
all dimensions

# marine risk & navigational modelling

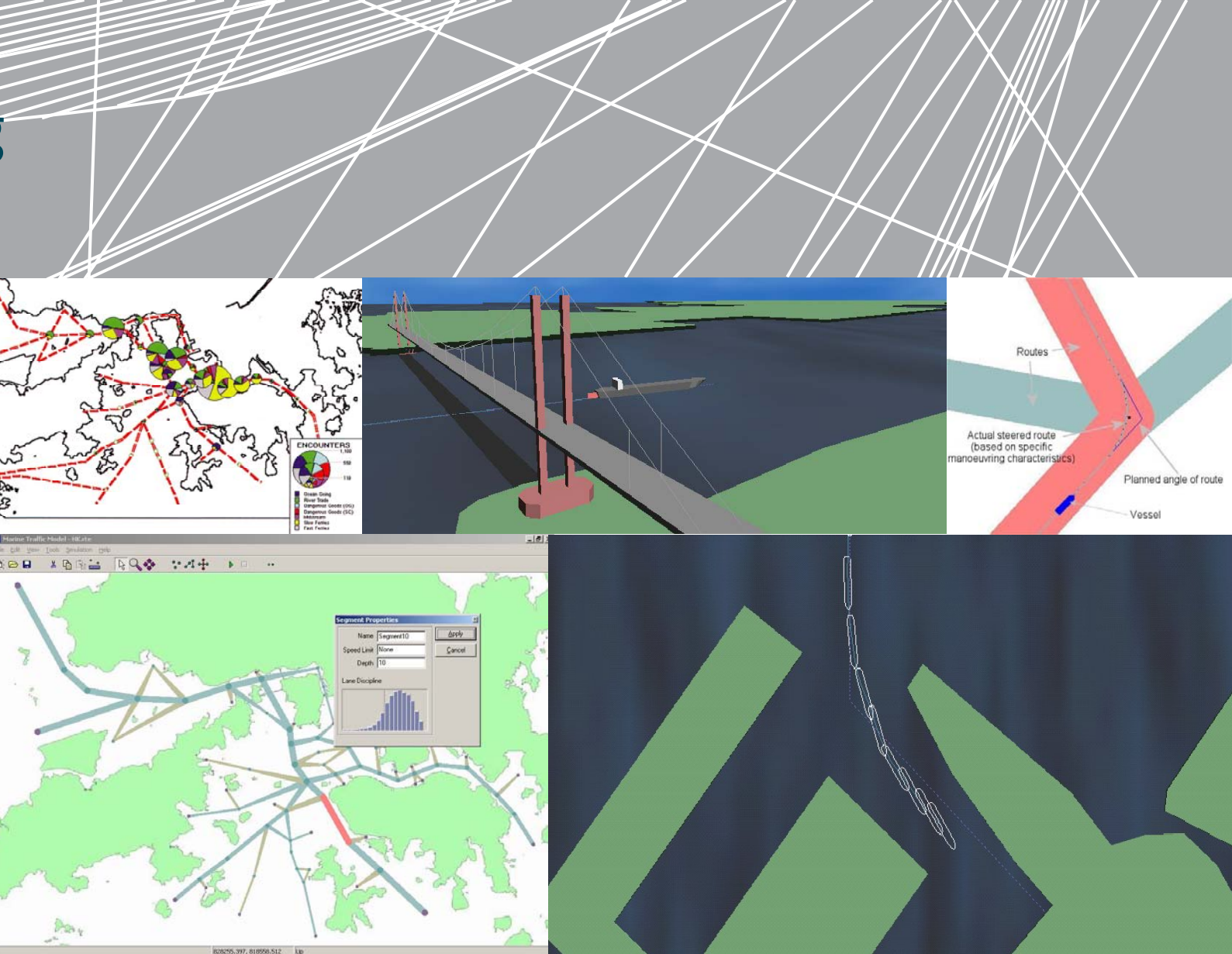


## to explore “what if?” scenarios

Royal Haskoning's Marine Traffic Risk Assessment Model (MARTRAM) provides a sophisticated modelling tool that is optimised for the analysis of marine risk in areas of congested and high volume marine navigation. As with any transport network, marine navigation increasingly requires assessment and review of potential risk. The model incorporates a wide range of features that allow realistic representation of marine navigation while permitting the modelling of major navigational study areas without compromising speed and accuracy of the model

and its output. The tool allows full "what if?" scenario analysis providing flexibility for the model analysts to manipulate routes and vessel patterns to assess any range of options.

MARTRAM is configured to model marine risk, the potential for accidents rather than assessing the level or nature of the hazards associated to the risk. In essence, the model focuses on the potential for vessel collisions where one or more vessel is under navigation. The level of marine risk is measured in terms of vessel encounters, and the model



## better management of existing assets

will also provide data for analysis related to strandings and grounding based on the physical characteristics of the navigational channels and the volume of shipping passing through them. The model is highly configurable with the analyst able to specify detailed parameters for as many classes of vessel as are required for the study. Vessel parameters allow for physical dimensions of each vessel class as well as the vessel draught, safety domain, maximum operating speed and navigation / manoeuvring characteristics. Based on these vessel parameters, MARTRAM offers real world

analysis in an efficient and safe modelling environment with the results being produced in animated formats as well as numerical output.

With the growth of LNG shipping, MARTRAM has proven to be invaluable in the environmental assessment of new shipping routes and terminals along existing heavily-trafficked estuaries.

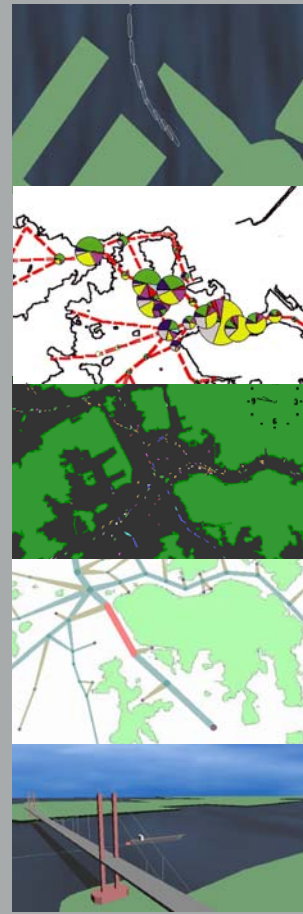
Royal Haskoning is an independent, worldwide operating consultancy that has its origins in a firm established in 1981 in the Netherlands. The consultancy now has a staff of over 4,300 who together combine in a wide range of knowledge and experience. Rooted in a technical background, our consultancy services focus on the broad field of the interaction between people and their environment, in the fields of spatial development, infrastructure & transport, building management & consultancy, architecture & building, building services, industrial installations, mechanical & electrical services, environment, water, coastal & rivers and maritime. We are committed to working enthusiastically with our clients to achieve sustainable solutions in an increasingly complex society.

The expertise and experience of our professionals in a variety of disciplines allow us to consider all technical, logistical, architectural, legal, organisational, social, environmental and economic aspects of your projects, in order to develop sustainable and practical solutions. Royal Haskoning has subsidiaries and partners throughout the world. Through our branch and project offices in Europe and overseas, we have access to all major international markets. This way, Royal Haskoning offers multidisciplinary and integrated services locally, based on experience, built globally. With our personal service in consultancy, we contribute effectively to the successful planning, design, implementation, commissioning and operation of projects and programmes and enhance our clients' work with added value.

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- ACE The Association of Consulting Engineers
- BCCB British Consultants & Construction Bureau
- PIANC International Navigation Association
- ICHCA International Cargo Handling Co-ordination Association
- CIRIA Construction Industry Research Information Association British Section
- ICID International Commission on Irrigation and Drainage
- IEMA Institute of Environmental and Management Assessment
- FDIC International Federation of Consulting Engineers

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# thinking in all directions

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