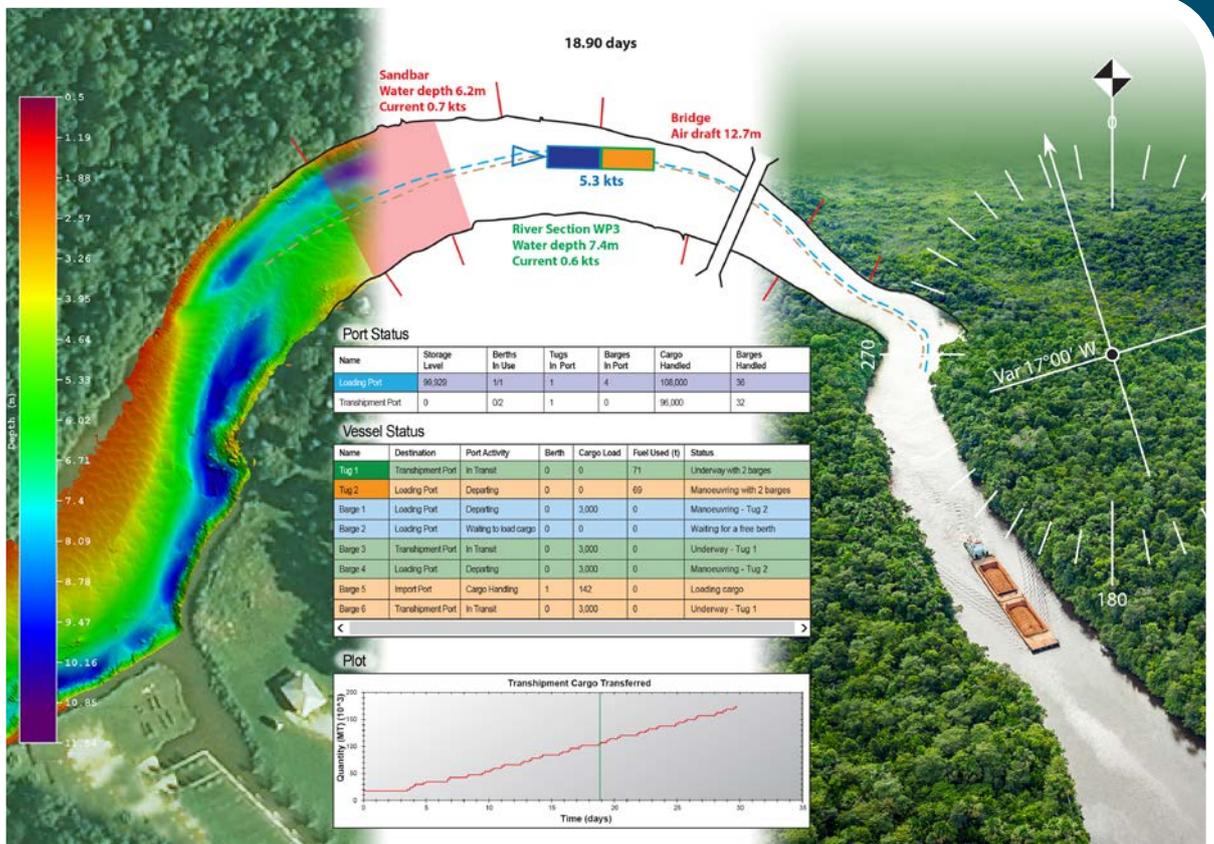


Architects of waterborne logistics

iBarge



The illustration represents a river broken into 3 sections, the left an aerial view with JP Knight's multi-beam survey data superimposed, the centre is the iBarge representation of the river complete with indicative data tables, and the right is a photograph of the barging operation (Not to scale)

JP Knight introduces the World's first 'complete' waterborne logistics modelling system. No more bar graphs and guesswork, iBarge enables you to determine the optimum solution for the transportation of bulk materials by water. Capturing 125 years of experience in the maritime towage industry, and developed in collaboration with HR Wallingford, global leaders in hydrodynamics, navigation and coastal engineering, iBarge has a proven track record and has been verified against existing operations. The results are totally authentic, minimising project risk and giving absolute confidence to clients and investors that your proposed operation will deliver as planned.

What is iBarge?

JP Knight's revolutionary product, brings cutting edge technology to the way that rivers and coastal waters are utilised to transport bulk materials. At its heart is an immensely powerful computer programme that creates a virtual waterway of any river, allowing the optimum and most cost-effective transport solution to be designed.

Over 50 independent parameters are used to represent all of the key variables in a logistic operation. These are accurately taken into account and programmed into the model, and include port handling loading/unloading rates, stockpile sizes, vessel dimensions and characteristics, tides, water depths, air draught of bridges, navigation hazards etc. Each variable can be adjusted to derive the best configuration.

Every vessel is visually depicted on a scalable chart of the waterway showing the cumulative throughput of tonnage from loading to the discharge point. The solution can be demonstrated in a fraction of the time that current analytical simulations take and to an unparalleled degree of accuracy and dependability. An entire year of simulated operations can be run in a few minutes, then changed and run again, giving

clients a unique opportunity to explore the project's full range of assumptions. Equipment failure and scheduling variations can also be factored in to assess the overall impact on the operating cycle.

As the model has been extensively tested on JP Knight's operations, we are confident that the software will find savings in any client's existing activities, anywhere in the World.

As a major enhancement to iBarge, and available at an additional charge to a client, JP Knight has acquired a sophisticated river bed mapping multi-beam sonar to provide unrivalled imaging of berths, harbours and rivers. The equipment can be rapidly deployed to any part of the World and provide HMO quality hydrographic data within days.

What will iBarge deliver for you?

iBarge can be utilised to:

- > Develop a new supply chain complete with the capacities and capabilities required at ports and transshipment locations, employing any vessels from push tugs and barges through to ocean going bulkers.
- > Improve the performance of an existing operation.
- > In project development, generate and review a range of options to find the most efficient waterborne transportation solution.

- > Visually and numerically demonstrate an operation to investors, owners and clients.

When waterways are not sufficiently charted or surveyed, JP Knight's in house draftsman will create a chart by fusing all available data together, whether it be local charts, Google Earth or local knowledge. Fuel consumption is also factored into the algorithm so that an accurate price per unit weight can be calculated. Nothing is missed.

With well over a Century of experience and ground breaking innovative spirit, JP Knight can assure clients of the most cost effective logistics solution.

What is the format of the iBarge solution?

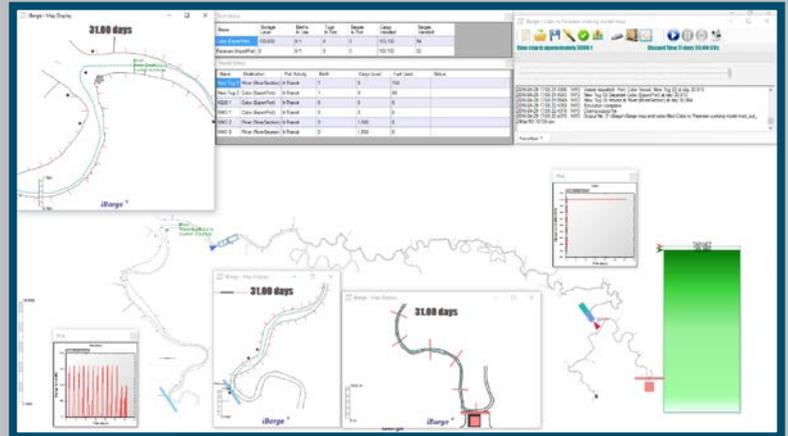
Results can be delivered by all of the following:

- > Spreadsheet
- > Graphically
- > Numerical tables
- > Video (played from real time to 3000x real time)

Case study - operation in Suriname, South America

The illustration is a screen shot of iBarge set up for this operation showing the full extent of the river with expansions for the loading and unloading ports and one of the constraints in the river, complete with environmental data. Graphs show the activity at the ports, as do the tables. The iBarge control window in the top right corner gives a running commentary of system activity.

This was a 10 year contract transporting 1.4m metric tonnes per annum of bauxite from a mine 116 nautical miles to the alumina refinery. During the last year of the contract, there was a requirement to bring in new smaller barges of varying sizes. iBarge was used to redesign the operation in order to deliver the revised targets. This was achieved with absolute precision, with the model's predictions proved in reality. A surprising conclusion learnt from running this operation through iBarge was that more barges did not necessarily mean a higher delivery rate, thus saving our client money.



The comprehensiveness of iBarge can be appreciated by the number of variables that are entered into the system. Amongst these are:

- > Location
 - Predicted operating days in a year
 - Type of cargo/handling restrictions
 - Annual target - for each grade of material
 - Profile through year
- > Waterway navigational constraints
 - Air draft of bridges
 - One way traffic/daytime navigation etc
- > Equipment*
 - Tugs - type/number/size/fuel consumption
 - Self-propelled barges - type/number/size/fuel consumption
 - Barges - number/size
 - Bulkers - type/number/size/fuel consumption
- > Environmental
 - Minimum charted depth of water at shallow points along route
 - Spring tide HW/LW, diurnal profile at multiple points along route
 - Neap tide HW/LW, diurnal profile at multiple points along route
 - Resulting tidal streams/currents at key sections along the route
- > Port information**
 - Cargo loading port
 - Number of berths
 - Stockpile size (t)
 - Rate stockpile replenished (t/hr)
 - Loading rate to vessel
 - Berthing/unberthing time
 - Intermediate port/s visited en route
 - Cargo discharge port
 - Number of berths
 - Stockpile size/Silo vessel (t)
 - Loading rate to stockpile/Silo vessel (t/hr)
 - Loading rate to OGV (if transshipment)
 - Frequency of arrival of OGV (+/- hours/days)
 - Berthing/unberthing time

*JP Knight inputs in agreement with client

**No limit to the number of ports



Who can benefit from iBarge?

- > Governments to verify national investment
- > Major financial institutions such as the World Bank, to test assumptions before investing
- > Banks and investors to verify that an operation meets expectations
- > Mine developers and operators for designing logistic solutions
- > A company wishing to objectively test assumptions for new equipment or improve the efficiency of an existing operation
- > Consultants for scoping logistic options
- > Insurers seeking to de-risk an investment

How to obtain iBarge

iBarge software licences can either be purchased with a set-up and support package or, JP Knight can provide a full advisory service, built on 125 years of experience in the marine towage business, with a tailored output from iBarge.

Please contact:

Email: iBarge@jpknight.com

Postal address: Director - iBarge,
JP Knight Group Ltd, The Admiral's
Offices, Chatham Historic
Dockyard, Kent, ME4 4TZ, UK.

Software development

Built on a highly flexible software platform, iBarge has infinite development potential to suit clients' unique requirements. The software is backed up by a comprehensive support contract with HR Wallingford.

System requirements

Microsoft Windows 7 and 10, Quad Core processor preferred.

Further information

To view the iBarge presentation, understand how solutions can be offered or receive further information, please email: iBarge@jpknight.com