

# Optimum Ship Routing Services

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## 1 Standard Optimum Ship Routing Service

Optimum Ship Routing involves providing a vessel with a route recommendation prior to sailing and thereafter closely monitoring the progress of the vessel en route and updating the Master to ensure the vessel achieves either the earliest possible safe arrival or arrives safely at the required time. In case of the latter a clam sea speed setting will be suggested taking into account the weather, sea and current forecast ahead and an allowance for any variation in the expected speed loss

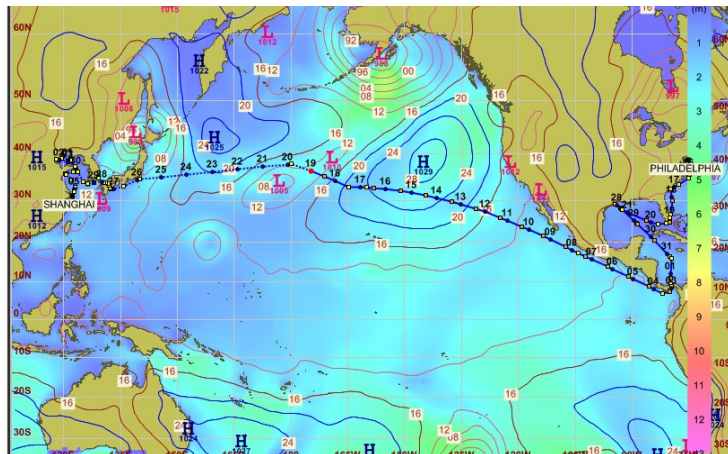


Chart showing the Optimum Route Recommendation for a vessel transiting the Pacific Ocean

This service can also be of great use on “coastal” routes, by providing the master with advance warning of heavy weather conditions which might be encountered, for example, Tropical Storm conditions.

Standard Ship Routing services can also be provided in combination with an onboard voyage planning system. Routing advice will be provided in addition to the regular weather data when sailing any cross ocean passage or in vicinity to severe weather events.

The provision of ship routing services should only be provided by those that have a wealth of experience and can be relied upon 24 hours a day, seven days a week, and are solely dedicated to ship routing. Only through complete dedication, extensive experience and high professional standards can any operator or owner rest easy knowing the best service is being provided. Any company can purport to provide ship routing but the recommendations and results can be entirely different and with disastrous results.

Vessels provided with any of our services automatically appear in the AWT Fleet and Weather Portal – a password protected web based application providing useful information which answers questions like: Where is my ship right now? What is the ETA? What weather is she experiencing? Will there be any ETA delays due to weather? What is the weather in the area? Are any Tropical Storms affecting my ships?, etc.

## 2 BonVoage System (BVS)

The BonVoyage weather data System (BVS) is a powerful, onboard, computer based route optimisation and weather data display package, which provides masters with the tools upon which to conduct efficient voyage planning with resultant improved safety and voyage performance.

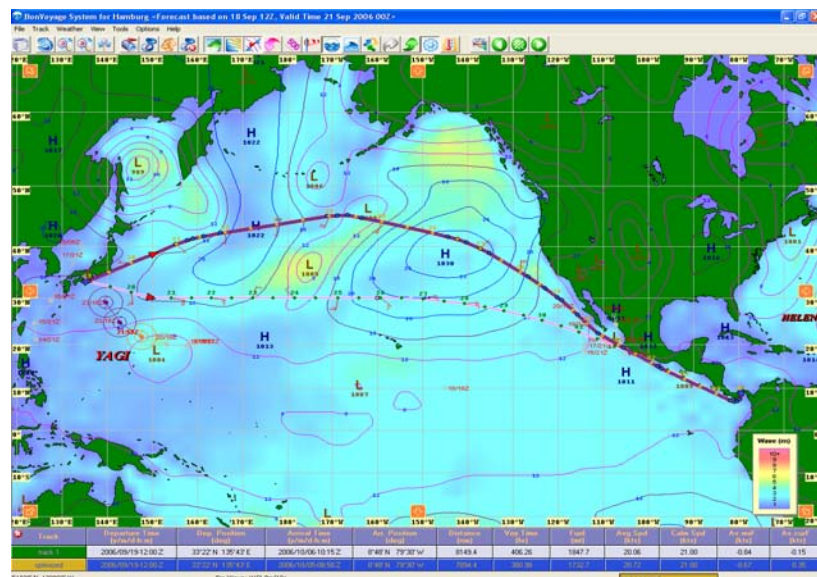
BVS is an icon-driven graphical display system providing AWT's proprietary detailed and comprehensive weather forecast out to 16 days directly onboard, such as: surface pressure, fronts, winds, significant wave height, swell, tropical storm information, current conditions, ice information, etc.

The small, well compressed data is easily delivered onboard through e-mail. Once the data is loaded into BVS onboard, the Master can calculate the optimum track to follow to achieve earliest safe arrival, taking into consideration the specific speed-keeping characteristics of the vessel.

As well as being able to determine the optimum route for the vessel to follow, BVS allows the Master to calculate alternative tracks avoiding certain pre determined weather conditions and areas or on the basis of a required ETA.

### Optimised Routing and Route Comparison.

BVS will calculate the optimum route - either for minimum time or minimum fuel - for the vessel to follow based upon the specific vessel criteria and the forecast conditions ahead. Alternatively the master can set certain weather thresholds which should be avoided along the optimised route as well as define no go areas that are blocked for the optimisation. The Master can then compare this Optimum track with any number of reasonable alternatives.



BVS chart showing different route alternates for a vessel sailing cross Pacific

Both, the standard ship routing services and the onboard voyage planning system BonVoyage assist the Master in:

#### Averting Risk ...

- Protect crew, ship and cargo from extreme conditions and dangers.
- Avoid costly structural damage and expensive repairs.
- Take the most cost-effective route while avoiding hazardous areas.
- Arrive on time while reducing fuel consumption.

#### Achieving Results ...

- Optimise routes to avoid specific weather conditions.
- Predict potentially damaging conditions before they occur.
- Optimise routes to avoid restricted zones.
- Optimise routes on the basis of a fixed ETA.

### 3 Weather Data

The provision of reliable weather data is vital for a ship routing provider. AWT is using weather data from various sources and applies unique methods to improve the data quality. For example the tropical cyclones are usually poorly handled in global numerical model data, even at the model analysis time. The latest NHC, CPHC, JTWC warnings are used to modify the global numerical model winds around analysis and forecast locations of active tropical cyclones. This results in a better wind depictions and better wind input to the AWT WWIII wave model. This model is implemented on a global basis and run twice daily at forecast time 00z and 12z with a forecast range of +384 hours. Unique AWT methods are applied, e.g. for spectral energy decomposition (up to 5 wave trains).

### 4 Applied Weather Technology - Company Profile

Incorporated in 1994 Applied Weather Technology Inc (AWT) is today one of the worlds' leaders in ship routing services and on-board weather related systems. The Company Mission is to be dedicated to ensuring only the very best service to the marine industry through the provision of professional ship routing services. Staffed by industry experts in ship routing, voyage optimisation and the complex science of ship performance, AWT provides ship owners, operators and masters with 24-hours per day support, 365 days a year.

AWT believes the need for dedicated, committed, and locally based personnel is paramount to ensure customer demands are met to the highest possible standards. AWT is committed to providing regional fully staffed customer support centres in the Americas, Europe, S.E. Asia and Far East.

AWT provides shore based routing services to more than 2000 vessels every month plus a further 1500 owner operated vessels fitted with AWT on-board ship routing weather and software system BVS. This rapid growth has been achieved through the development of an up to date and modern ship routing service utilising the expertise of personnel previously employed by the principal player in the industry and secondly, the continued trust and support from the major shipping companies.

*Thomas Weber started his professional career as a seaman and obtained his doctor's degree on Voyage Planning and Optimum Ship Routing from the University of Berlin after periods of scientific research at the University of Rostock. He then joined the company Oceanroutes for 10 years before taking up his present position as senior development manager in charge of on-board ship routing software development with Applied Weather Technology.*