

EMERGING KERALA 2012

DEPARTMENT OF PORTS, GOVERNMENT OF KERALA

Hydrofoil Service for Passengers

**Feasibility Report
August 2012**



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KERALA, INDIA-682016**

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| Executive Summary | |
|---------------------------------|--|
| Name of Project | Hydrofoil service between Kochi and Agatti / Male |
| Project Details | The travel options connecting Kochi or Trivandrum to Agatti, and Male is currently economy passenger ships and a few flights. There is ample market space for a hydrofoil or jetfoil service connecting Kochi to Agatti, Colombo and Male. The large Indian outbound tourist segment and the upmarket inbound tourists that Kerala attracts are ready markets for this service. This service would be positioned between the passenger ships and the flights, in terms of travel time and costs. This will be a long passage for a hydrofoil in open unprotected waters and hence safety issues must be carefully evaluated. |
| Location | Kochi to Agatti and Male |
| Proposed Capacity | One round trip hydrofoil service everyday from Kochi, touching Male and Agatti on alternate days with 250 passenger capacity hydrofoil vessel, operating 8 months of the year in non monsoon months. |
| Period of Implementation | 12 to 24 months |
| Financials | |
| a | Investment |
| | Rs. 2200 lakhs. Estimated cost of hydrofoil or jetfoil. |
| b | Revenue streams |
| | Passenger fare for the sector. Marginal additional revenue from high value cargo or onboard catering. |
| c | RoI |
| | 19.00 % at estimated occupancies. |
| Economic Benefits | <ul style="list-style-type: none"> • Boost to Lakshadweep tourism • Boost to Kochi port's tourism and cruise services activity • Increased employment • Development of tourism circuits in the sub continent. |

Summary

The hydrofoils are seaborne vessels that lift itself on its ‘wings’ or ‘foils’ when moving at high speeds. The later version of these crafts are the ‘jetfoils’ since they operate on water jet power, instead of a conventional propeller.

These crafts usually have ‘seat’ arrangements and rarely ‘cabin’ accommodation. The cruise time ranges from 5 min to less than one hour. It is mostly seen to operate in distances of 30 to 50 NM in semi protected waters. Due to the ‘seat’ arrangement, these crafts are means of fast ‘premium’ travel over short distances.

Any water mode of travel is attractive when the land distance over the same circuit is comparatively very high i.e around a bay or impossible as in case of visiting Islands. When the water distance increases to over 20 NM, the fast crafts such as hovercrafts and hydrofoils are preferred due to its high speed. However, these crafts are not comfortable over long distances due to its ‘seat’ approach that effectively puts a limit of 4 to 5 hours on comfortable travel time.

The issue of operating in exposed waters is a concern due to its small size. The size of a vessel is related to the waves it can withstand comfortably. These hydrofoils have to drop their speed in case of heavy weather i.e waves and swell. This will increase her time in bad weather and make it difficult to escape a worsening weather situation. This is a point of serious concern when considering the scenario of such a craft with 200 passengers onboard, 100 NM from land and unable to progress on its passage in worsening weather. The distance from Kochi to Agatti or to Male is roughly 200 NM and is wholly exposed waters. The transit time will be close to six hours.

These crafts due to their high speed profile are necessarily small in size and therefore sensitive to waves and swell. This causes ‘g’ or vertical accelerations and passenger discomfort in rough weather. This is like the aircraft in turbulent weather, within limited extent, is uncomfortable but not a safety issue.

The tariffs in various such circuits around the world indicate good financial feasibilities. The financial feasibility of the circuit between Kochi and Agatti or Male is also seen to be good when we study the ‘time / cost’ tradeoff between the various modes of travel i.e Hydrofoils, flights and cruise vessels.

In view of the long passage in very open waters, it is not considered a safe idea to operate such hydrofoils or jetfoils in these long and fully exposed passages.

The sector

This is the sector catering to premium passengers travelling through water. The most known among these are the Hong Kong to Macau route where earlier hydrofoils and now jetfoils travel.

Similar high speed travel options are available from hovercrafts. While hovercrafts provide the option of movement over water or shallow flat land, this option is not available in hydrofoils or jetfoils. Hence the choice is driven by the topography and hydrography of the location specific application.

Hydrofoil

The craft lifts itself up out of water when in motion with the help of foils or wings'. Most of the lift for the vessel is provided by the 'foils' or 'wings' when moving, and little by way of displacement. In the process the waterplane area reduces drastically and hence lower resistance allowing it to move at high speeds.

Jetfoil

The jetfoil is the later version which propels itself by jets and not by propellers.

A pump-jet, hydrojet, or water jet, is a marine system that creates a jet of water for propulsion. The mechanical arrangement may be adducted propeller with nozzle, or a centrifugal pump and nozzle. Pump-jets used to be limited to high-speed small crafts. The pump-jet is gaining popularity on larger crafts and ferries in particular. Speeds of up to 40 knots can be achieved with this configuration, even with a conventional hull.

WIGJET craft

The recent development is the Wigjet boat which looks like a plane flying at a low height but is registered as a boat in Singapore. It floats in the air at a height of about 8 to 10 feet above the water. However this craft gets its lift from its wings and not from a downward air draft as in case of hovercraft.

Various types of Hydrofoils

| Hydrofoil Type | LOA | Beam | Passenger Capacity | Speed (Top/Cruise) | Operational Range |
|---|---------|---------|-----------------------------------|---|----------------------------|
| Kolkhida | 31.25 M | 5.8 M | 125 | 35 knots | 300 Nautical Miles (Range) |
| METEOR TYPE | 34.6M | 9.5M | 123 | 65.9 KM/H AT 1650 RMP | |
| Voskhod Passenger hydrofoil (Voskhod 2/2M) | 27.6M | 6.2M | 71/crew-3 | 32 Knots | |
| Wastok Type | 25.87 M | 4,40 M | 94 | | |
| Raketa Type | 22.70 M | 4.40 M | 66 | | |
| Kometa Type | 35.10M | 11.00 M | | 35 Knots | 240 Km(Range) |
| RAKETA Type(Project 340, 340E and 340ME) Medium Sized Passenger Hydrofoil | | | Depends on model from 58-64 Pax | 31-32 Knots(Cruising Speed) | |
| METEOR Type(Project 342, 342E and 342U) Large Sized Passenger hydrofoil | | | Depends on model from 112-123 Pax | 35,6 Knots (Top Speed) 32 knots (Cruising Speed) | |
| METEOR-2000 Type Large-sized Passenger hydrofoil | 34,6M | 9,5M | Depends on model from 104-116 Pax | 75Km/h (Top Speed) | 600 Km (Range) |

| Hydrofoil Type | LOA | Beam | Passenger Capacity | Speed (Top/Cruise) | Operational Range |
|--|------------|-------------|----------------------------|--|--------------------------------------|
| KOMETAType (Project 342ME) Large-sized river-sea going passenger hydrofoil | | | 118-120 PAX | 33 Knots(Cruising Speed) | 445Km(Operati onal Range) |
| KOMETA-B type Large-sized river-sea going passenger hydrofoil | 37,54M | 8,4M | 110 & 5 crew members | 36 Knots(Top Speed) 34 Knots(Cruising Speed) | 445Km(Operati onal Range) |
| BELARUS type (Project 1709R) Small-sized passenger hydrofoil | 18,5M | 3,2M | 40PAX | 65km/h(Cruisin g Speed) | 320Km(Operati onal Range) |
| POLESYE type (Project 17091) Small-sized passenger hydrofoil | 21,3M | | 53 PAX | 36Knots(Cruisin g Speed) | |
| MAHART PassNave | | | 26 PAX | | |
| VOSHOD type (Project 352) and VOSHOD-2 type (Project 03521) Medium-sized river ang river-sea going hydrofoil | | | 71-77 PAX | 33,5Knots(Top Speed) | 460- 500Km(Operati onal Range) |
| Voszhod-2 | | | 68-71 | | |
| VOSHOD-2M type (Project 03521-M) Medium-sized river ang river-sea going hydrofoil | | | 71-77 PAX | 33,5Knots(Top Speed) | 460- 500Km(Operati onal Range) |

| Hydrofoil Type | LOA | Beam | Passenger Capacity | Speed (Top/Cruise) | Operational Range |
|--|------------|-------------|--|--|--------------------------------|
| LASTOCHKA type (Project 03525) High speed river-sea going hydrofoil | 31M | | 77 PAX & 4 crew members | 80-85 Knots(Top Speed) 40Knots(Cruise Speed) | |
| LASTOCHKA-M type (Project 03525- M) High speed river-sea going hydrofoil | 29,97M | 7,13M | Depends on model 65- 79PAX& 4 crew | 45Knots(Top Speed) 40Knots(Cruise Speed) | 550Km(Operati onal Range) |
| KATRAN type (Project 10390) Large-sized river-sea going passengerhydrofoil | 34,5M | | 141- 148PAX & 4 crew | 35Knots | 370Km Operational Range) |
| KOLKHIDA type (Project 10391) Large-sized river-sea going passengerhydrofoil(Newer Version of Katran) | 34,5M | | 141- 148PAX & 4 crew | 35Knots | 550KM(Operati onal Range) |
| KOLKHIDA-M type (Project 10391-M) Large-sized river-sea going passengerhydrofoil9 newer version of Kolkhida) | 34,5M | | 133 & 5 crew | 35Knots | |
| CYCLONE type (Project 12352) Large sea going hydrofoil | 44,2M | 12,6M | 250PAX & 8 crew | 42Knots (Cruising Speed) | 550KM(Operati onal Range) |

| Hydrofoil Type | LOA | Beam | Passenger Capacity | Speed (Top/Cruise) | Operational Range |
|--|------------|-------------|---------------------------|---|------------------------------|
| CYCLONE-M type Large sea going hydrofoil | 44,2M | 12,6M | 250PAX & 8 crew | 42Knots (Cruising Speed) | 550KM(Operational Range) |
| OLIMPIYA type (Project 14600) Large sea going hydrofoil | 43,1M | | 250PAX& 6 crew | 37Knots(Cruising Speed) | 550KM(Operational Range) |
| BUREVESTNIK type (Project 1708) Experimental gasturbine hydrofoil | 43,2M | 7,4M | 150PAX | 54Knots(Top Speed)50Knots(Cruising Speed) | |
| CHAYKA type (Project 1705) Experimental high speed hydrofoil | 26,3M | 3,8M | 30PAX | 86Km/h(Top Speed) | 400KM(Operational Range) |
| SPUTNIK type (Project 329) Large-sized experimental hydrofoil | 47,3M | 11,7M | 256PAX | 41Knots(Top Speed) 35Knots(Cruising Speed) | 600-650KM(Operational Range) |
| VIKHR type (Project 330) Large-sized river-sea going experimental hydrofoil | 47,5M | 11,4M | 260PAX | 40Knots | |

<http://hydrofoil.homestead.com>

Comparison of various fast seaborne travel

Speed Reduction Comparison- www.internationalhydrofoilsociety.com ^[1]

Speed, comfort and safety are the most important criteria one considers while choosing a HSMV (High speed marine vehicle). But, speed can vary depending upon the sea conditions, therefore in rough seas it can be noted that the speed reduces distinctively to a certain amount as shown in the table.

| | Hovercraft 40t | Catamarans 300t | Hydrofoils 200t |
|---------------------------------------|---------------------------|----------------------------|----------------------------|
| Service speed (Knots) | 40 | 31 | 50 |
| Speed under sea states 6-7 | 7 | 20 | 47.5 |
| Speed loss % | 82.5 | 35.5 | 5 |

The sea keeping performance of fast ferries is often illustrated by way of graphs of RMS vertical acceleration levels typically expressed in g's versus motion frequency for particular sea conditions. This can be obtained from a Rodriquez brochure of RHS 160F series. It can be understood from the graph that 10% of the people can experience motion sickness for a certain period of exposure.

Comparison of various modes of travel

| | Jetfoils and hydrofoils | Flights | Cruise ships | Overland |
|--|--|---|---|-----------------|
| Speed | Upto 50 knots | Upto 500 knots | Upto 20 knots | Often no option |
| Comfort in long circuits | Usually seating only | Time taken is small | Cabin accommodation | Usually seating |
| Time taken in bad weather | Substantially increases beyond a certain threshold of weather | Little effect | Substantial effect beyond a small threshold of weather | Little effect |
| Fare | Moderate | Higher than Hydrofoils | Lower than hydrofoils | Low |
| Reaction to wind speeds and sea state | High | Reaction to wind turbulence but small time period | Low depending on size of vessel | NIL |

Overland: The popular circuits where the hydrofoils operate do not have a viable option for operating overland transport due to its geography. Typically these are between islands or one end is an island, around a bay or a creek.

Cruise ships: The cruise ships are usually larger in size, have cabin accommodation and able to withstand a higher wave and swell condition due to their size. The hydrofoils on the other hand are generally smaller in size and very sensitive to sea state. The hydrofoil usually has only seating arrangement and very few have cabins. This makes it suitable for shorter circuits ranging from 5 minutes to 2 hours. Hence for longer distances i.e > 150NM, or in exposed waters, the operator's preference gradually moves towards larger cruise ships.

Flights

The flights are definitely an option for the users of hydrofoils if there is an airport on both ends. However the usual turnaround time for flying including airport transit time may make it unattractive to fly over short circuits.

Clientele

There are two distinct set of travelers to these destinations i.e Kochi to Lakshadweep sector. The Island population and the tourist traffic.

The island population enjoys government subsidized means of travel on ferries. Unless the subsidy is extended to this premium mode of travel, it is unlikely that the local population will patronize this.

The tourist is seeking new experiences and hydrofoil is a new experience quite different from the usual flights. This will make hydrofoil travel a preferred choice given its cost effectiveness, subject to monsoon conditions.

Lakshadweep is fairly untouched by tourism where only Agatti and Bangaram are popular tourist spots. There is a lot of potential for tourists to visit this area.

Male, capital of Maldives, sees premium tourists from around the world. This section of tourists is well heeled and affords expensive resort accommodations in these islands. Cost is not a major factor here. The Indian outbound travel market is increasing every year given the affluence of the Indian middle class and this section will increasingly visit the Islands of Maldives.

Customer requirements

Speed

The biggest expectations of a customer opting for this travel mode are speed of travel and the novelty. The hydrofoil is invariably faster than conventional mono hull boats and catamarans.

Low ‘g’ effect

Hydrofoil and such high speed crafts usually react to waves and their speed is reduced in rough weather. The vertical acceleration causes discomfort to the passenger and hence passengers are sensitive to this vertical ‘g’. Passenger would prefer a larger vessel and designed to handle the sea better. It may be noted that the popular hydrofoil circuits operate in partially protected waters.

Cheaper than airfare

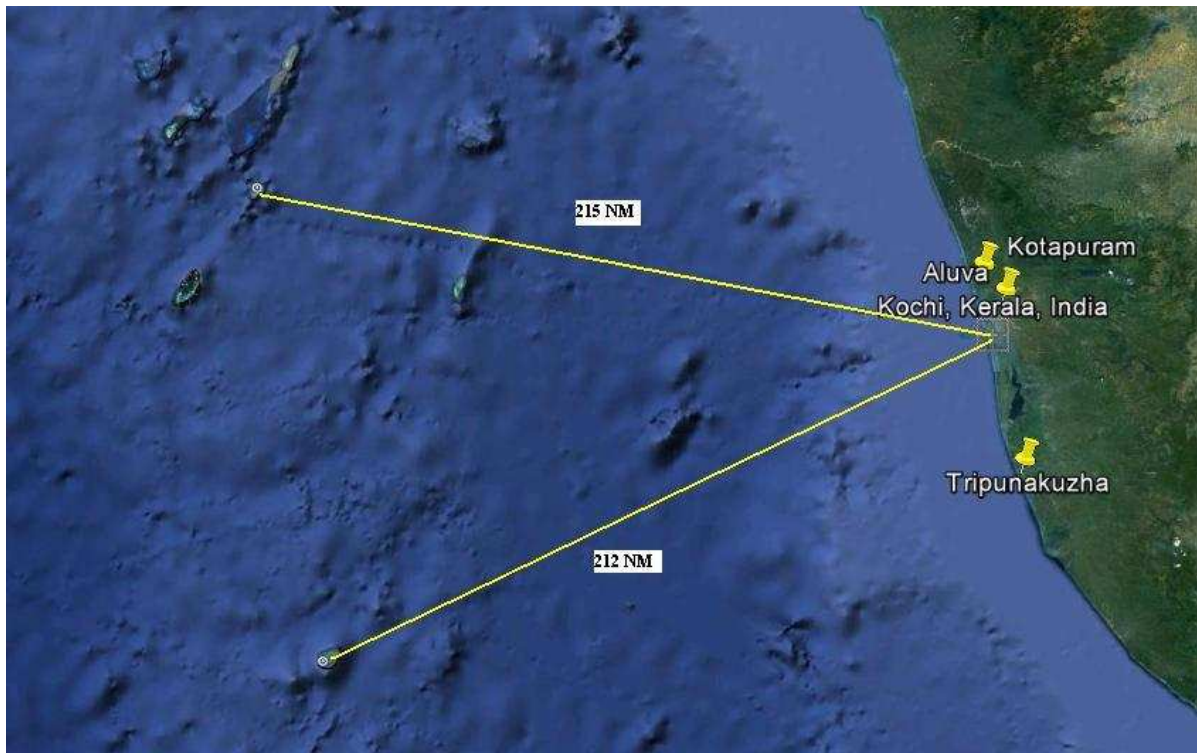
The passenger expects the cost of travel by hydrofoil to be cheaper than airfare.

Onboard facilities

Customers would seek Food and beverage, besides entertainment onboard to spend 6 hours travel time. It may be noted vessel is passing open sea and not the coast so there is no view to keep them absorbed for 6 hours.

Financial study

Estimate of cost inputs and feasibility



Google earth ^[2]

The distance is taken as 200 NM

The time taken for a one way passage is taken as 6 hours.

One hour for turnaround.

Estimated cost of a vessel is taken as 4 million usd.

Sample vessel

Seating capacity 250 seats.

Main engine fuel consumption 540 ltrs / hour at cruising speed.

Generator consumption is 25 ltrs / hour taken as 650 ltrs/ day.

One return passage to Agatti and the next day, one return passage to Male is envisaged.

The specifications of the vessel taken for financial feasibility study is in annexure 1

Tariff

Current ballpark fares:

| | Ship | Flight |
|------------------------|-------------|---------------|
| Kochi to Agatti | 3000 | 6000 |
| Kochi to Male | NIL | 12000 |

The seating capacity of the vessel taken for the study is 220.

For the purpose of this study, the average one way net tariff (net of TAC or travel agency commission) seat from Kochi to Agatti is taken as Rs.2500/ and to Male as Rs.3500/. The vessel makes one return trip to Agatti on one day followed by one return trip to Male on the next day days. Providing service to each location on alternate days.

Financial Analysis

The service does not operate for the 4 monsoon months of June to September

| | | | | |
|---------|-------------------------------|--------|--------|--------|
| | No of one way trips a year | 480 | 480 | 480 |
| | %age occupancy | 100% | 75% | 55% |
| Revenue | Total seat capacity per annum | 105600 | 105600 | 105600 |
| | Yield per seat net of TAC | 3000 | 3000 | 3000 |
| | | | | |
| | Total Revenue (in lakhs INR) | 3168 | 2376 | 1742 |

| | | | | |
|------|-----------------------------------|--------|-------|-------|
| Opex | Fuel | 731 | 731 | 731 |
| | Maintainence, lubs and spares | 222 | 252 | 252 |
| | HR | 280 | 280 | 280 |
| | Shoreside and marketing personnel | 72 | 72 | 72 |
| | Marketing, admin and misc costs | 100 | 100 | 100 |
| | Operating expenses | 1404 | 1435 | 1435 |
| | | | | |
| | EBIDT | 1763.7 | 941.4 | 307.8 |
| | Interest | 195.0 | 195.0 | 195.0 |
| | EBDT | 1568.7 | 746.4 | 112.8 |
| | Depreciation | 160.0 | 160.0 | 160.0 |
| | PBT | 1408.7 | 586.4 | -47.2 |
| | Tax | 479.0 | 199.4 | -16.0 |
| | PAT | 929.7 | 387.1 | -31.1 |
| | ROI% | 46 | 19 | -2 |
| | ROE% | 143 | 60 | -5 |
| | DSCR | 4.77 | 1.98 | -0.16 |

ANNEXURE I Typical vessel taken for financial study

PS 30 JETFOIL

- Craft type : Monohull hydrofoil
- Ship builder : CSSC

Principle dimensions-

| | |
|-------------------------------|--------|
| Length overall | 29.1m |
| Length designed on waterplane | 25.37m |
| Beam | 8.6m |
| Draught | 4.5m |
| Depth molded | 2.6m |

Gross Tonnage- 303

Service speed : maximum 45knots.

Propulsion system-

- Main engine : 2 * Allison gas turbines 501-KF
- Water jet : 2 * Rockwell R10-0002-501
- Gear box : 2 * Rockwell R-0003-131 or 141

Power supply-

- Main system : 440/115 volts 60hz
- Generators : 2* Stamford RCM274C13
- Generator Engines : 2 * WeiCahi TD226B-6CD1

Annexure II Substitute means of travel

Male-Kochi Flight Schedule

These data have been collated from travel websites and are indicators of prevailing prices at that particular time.

| No. | Departure | Arrival | Flight | Fare(one way) |
|-----|------------|---------------|--|---------------|
| 1. | Kochi | Colombo | Sri Lankan Airways-UL166 | Rs.15375/- |
| | Colombo | Male | Sri Lankan Airways-UL103/ UL101/ UL115/ UL105 | |
| | Male | Colombo | UL110/ UL102/ UL116/ UL106 | |
| | Colombo | Kochi | UL167 | |
| | Kochi | Trivandrum | Air India AI-9505/AI-465 | Rs.4263/- |
| | | | Indigo 6E-315 | Rs.4148/- |
| | Trivandrum | Male | Air India AI-263 (Daily) | Rs.9162/- |
| | Male | Trivandrum | Air India AI-264(Daily) | Rs.7218/- |
| | Trivandrum | Kochi | Air India AI-9505/AI-466/AI- 9503/AI-929 | Rs.4271/- |
| | | Indigo 6E-316 | Rs.4156/- | |

Kochi -Colombo Flight Details

| No. | Departure | Arrival | Flight | Fare |
|-----|-----------|---------|----------------------------------|-----------|
| 1. | Kochi | Colombo | Sri Lankan Airways- UL166 | Rs.9501/- |
| | Colombo | Kochi | UL167 | |

Kochi -Lakshadweep Flight details

| No. | Departure | Arrival | Flight | Lowest |
|-----|---------------|---------------|-------------------|---|
| | Kochi | Agatti Island | Air India AI-9501 | Rs.9353/- (Highest) Rs.4739 (Lowest) |
| | Agatti Island | Kochi | Air India AI-9502 | R..4481/- (Highest) Rs.3957/- (Lowest) |

Kochi -Lakshadweep Passenger Ship details

<http://lakshadweeptourism.weebly.com> ^[5]

| No. | Destination | Class | Fare |
|-----|---------------------------|---------------|-----------|
| 1 | Cochin to Agatti Island | Diamond Class | Rs.5250/- |
| | | Tourist Class | Rs.3250/- |
| | | First Class | Rs 1750/- |
| 2 | Cochin to Bangaram Island | Diamond Class | Rs.5450/- |
| | | Tourist Class | Rs.3450/- |
| | | First Class | Rs 1950/- |
| 3 | Cochin to kavarthi Island | Diamond Class | Rs.5550/- |
| | | Tourist Class | Rs.3550/- |
| | | First Class | Rs 2250/- |
| 4 | Cochin to Mincoy Island | Diamond Class | Rs.5250/- |
| | | Tourist Class | Rs.3250/- |
| | | First Class | Rs 2350/- |
| 5 | Cochin to Kadmand Island | Diamond Class | Rs.5550/- |
| | | Tourist Class | Rs.3550/- |
| | | First Class | Rs 2250/- |

<http://www.clickindia.com> ^[6]

| Destination | | Class | Fare |
|--|-----------------------------|--------------------------------|----------|
| COCHI – AGATTI (Per Person One Way) | | | |
| | MV KAVARATTI | First Class (2 Berth Cabin) | Rs.5,000 |
| | | 2nd Class (4 Berth Cabin) | Rs.2,200 |
| | MV TIPU SULTAN | Deluxe 2 Berth Cabin | Rs.3,000 |
| | | First Class 4 Berth Cabin | Rs.2,500 |
| | | Push Back | Rs.2,000 |
| | MV AMINDIVI / MV MINICOY | Tourist Class | Rs.2,000 |
| | MV BHARAT SEEMA | First Class 2/4 Berth Cabin | Rs.2,000 |
| Tourist Class | | Rs.2,000 | |
| KOCHI - KADMAT / KAVARATTI / MINICOY (Per Person One Way / Age Above 3yrs) | | | |
| | MV KAVARATTI | Diamond Class (2 Berth Cabin): | Rs.4,000 |
| | | Gold Class (4 Berth Cabin): | Rs.3,000 |
| | MV TIPU SULTAN | Deluxe 2 Berth Cabin | Rs.3,000 |
| | | First Class 4 Berth Cabin | Rs.2,500 |
| | | Push Back | Rs.1,750 |
| MV AMINDIVI / MV MINICOY | Tourist Class | Rs.1,750 | |
| MV BHARAT SEEMA | First Class 2/4 Berth Cabin | Rs.2,000 | |
| | Tourist Class | Rs.1,750 | |

Annexure II Typical hydrofoil and cost

<http://hydrofoil.homestead.com>^[7]

(Below information is collated from websites at different times and is a rough indication of prevailing prices of such crafts)

METEOR TYPE

DW LIGHT 36.4 MT
DW LOADED 53.4 MT
LOA/B/H/ 34.6/9.5/6.25 M

M. ENGINES SERVICE POWER: 2 x 930 HP
PASS. CAPACITY: 123
DRAFT AFLOAT: 2.35 M
FOILBORNE DRAFT: 1.2M
SPEED: 65.9 KM/H AT 1650 RMP
NUMBER OF M.ENGINES: 2
TYPE OF M.ENGINES: M400
SIGN OF ROTATION: LEFT AND RIGHT
NUMBER OF CYLINDERS: 12 (62.4 L IN TOTAL)
TYPE OF FUEL: DIESEL OIL (MGO)
FUEL PUMPS: GEAR-TYPE, PRESSURE 2-4 KG/SM² (SQUARE CENTIMETER)
Exhaust system muffler: WET TYPE (UNDER WATER)

FUEL TANKS (TOTAL): 3.2 MT FOR 600KM AT SPEED 65 KM/H
FRESH WATER TANK: 300 L

SALOONS: FORE - 26 SEATS, MIDDLE - 46 SEATS, STERN - 46 SEATS
PASSENGER CABIN - 5 SEATS
BAR AREA: 5 M² (SQUARE METERS)
PANTRY AREA: 4.4 M² FOR BAR PURPOSES
BOATSWAIN STORE: 0.75 M²
WC NUMBER: 2

Voskhod Passenger hydrofoil

Voskhod-2
(Voskhod-2M) New Building
Principal dimensions:
Overall length, m 27.6
Overall beam, m 6.2 (6.4)
Foil-borne draught, m 1.1 (1.2)
Full displacement, t 28,0 (32,5)
Main engines capacity, kW 2x550..600
2xMTU, MAN, GM

Speed, knots 32
Passengers 71 (65)
Crew 3
Cruising capacity without refueling, miles 250
Navigation and communication complies with GMDSS

Hull

The hull is aluminium-magnesium alloy all-welded construction
year built : 1962
Length : 22.70
beam : 4.40
draught : 0.80
hull material : steel
engine : 730 kW
passengers : 66
DWT : 61
in working condition - in operation
from Euro 55,000



WIGJET craft

<http://www.youtube.com/watch?v=TYFEFekPzDM> ^[2]



<http://www.youtube.com/watch?v=qg14dKSBYm8> ^[8]

The waterjet system

Pictures of hydrofoils <http://hydrofoil.homestead.com> ^[9]





Annexure III News Reports

Kochi to Male Ship details ^[10]

Kochi | Posted on Jul 20, 2011 at 10:28am IST

A ferry service to connect Kochi and Male



Anil S

KOCHI: □ The Shipping Ministry is taking up a major initiative that could add to Kochi's tourism potential. For the first time in Kochi's history, a passenger-cum-cargo ferry service would soon be operated between Kochi and Male.

The decision was taken at a high-level delegation meeting between India and Maldives to improve bilateral maritime cooperation between the two countries last week. It has been provisionally agreed to initiate the preliminary work for a regular passenger-cum-cargo ferry between Kochi and Male. The ferry service, which would be preferably biweekly, would be run by a private operator but all facilities on either port of call will be made by the concerned ports.

Sources in the Shipping Ministry said as per the existing scenario the service would be commissioned in two months. "The Expression of Interest (EOI) for the ferry would be done by the Shipping Corporation of India. It has been cleared and the EOI would be floated by next week. Based on the response, the Request for Proposal (RFP) would be fine-tuned. Hopefully, we would be able to commission the service in two months," sources said.

The high-level delegation meet led by Union Shipping Secretary K Mohandas and Mohamed Latheef, Permanent Secretary, Ministry of Transport and Communication, Government of Maldives, also discussed various issues on bilateral cooperation. An agreement has also been made to promote leisure cruise service between India and Maldives.

Take a ferry ride to Maldives from Kochi

<http://www.karmakerala.com/news/tag/maldives>^[11]

 Published July 22, 2011 | By [usha123](#)



For the first time in the maritime history of **Kochi**, a passenger-cum-cargo ferry service would soon be operated between Kochi and Male. A major initiative of the Shipping Ministry, it could boost the tourism potential of **Kerala** in general and the city of Cochin in particular in the days to come. This decision was taken at a high-level delegation meeting between India and Maldives to improve the bilateral maritime cooperation between the two countries. An agreement has also been made to promote leisure cruise service between India and Maldives.

Initially a regular passenger-cum-cargo ferry service will be operated between Kochi and Male, which would probably be a biweekly service run by a private operator. However, all the facilities on either port of call will be made by the concerned ports. The service is expected to be commissioned in two months. The shipping and trading relations between Kochi and Maldives has tremendous scope to be developed considering the fact that last year only 25,000 Indians visited Maldives against 1.55 lakh Chinese, mainly because of lack of awareness or convenient transportation facilities for the tourists.

Annexure IV Mumbai to Goa ferries

From information in public domain



In the sixties and seventies, there was actually a pair of steamers which used to ply between Panaji and Mumbai, carrying loads of passengers on a charming journey along the Konkan coastline.

A catamaran service was started by Damania Shipping in 1994, between Mumbai and Goa, using a beautiful Scandinavian-built vessel, with aeroplane-style reclining seats. The trip from Mumbai used to take seven hours to reach Panaji. The catamaran too, travelled around 40 km offshore, giving travellers a glimpse of the palm-fringed Konkan coast.

The only service that operated for a long time was Konkan Shakti and Konkan Sevak from Moghul line, a govt of India company. Subsequently the hovercraft by Damania and Sam Link have started in Dec. 2004 and closed down in a short time. The Sam Link service was 8 hours duration between Mumbai and Goa. The fare was roughly Rs. 1700 to 2000/-. The services started from ferry wharf, which is a central location and the duration of 8 hours is good as compared to the tourist buses. The reasons for it closing down is not officially stated, though can be related to a vicious cycle of dropping revenues and passenger discomfort in the seaway. The Konkan services scored in having a vessel with roughly 4 m draft and ability to withstand light waves. The vessel had 'deck' passengers, who on a tight budget, actually spread their bedsheets and slept on the quarter deck. The vessel also had some cabin accommodation.

However the ship or catamaran services are no longer available.

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