THE MEGA-MOVE: HOW TO TRANSPORT A MANTA BIROSTRIS

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Dynasty Marine was contacted in 2017 to collect and transport a Manta birostris for Nausicaa’s grand re-opening in 2018.
MILESTONES OF THE PROCESS

- PERMITTING
- COLLECTION
- TEMPORARY HOLDING AND ACCLIMATION
- TRANSPORTATION
OUR EXISTING TECHNOLOGY

- Rapid cabin depressurization off-gassing capabilities
- Pliable but durable lid
- Separation of pump and water space
- Automated water buffering capabilities
ADVICE FROM OUR COLLEAGUES – RIPLEY’S
ADVICE FROM OUR COLLEAGUES
GEORGIA AQUARIUM
MUST FIT ON AN AIRCRAFT PALLET 6,045 MM LONG AND 2,438 MM WIDE

MUST FIT INSIDE THE PLANE DOOR 2,500 MM TALL

MAX WEIGHT OF 13,500 KG (FOR TRUCKING ON ROLLER-BED TRAILER)

MUST PASS ALL IATA REGULATIONS (45 DEGREE TILT TEST, ABILITY TO WITHSTAND RAPID CABIN DEPRESSURIZATION)

MUST KEEP THE ANIMAL ALIVE FOR WELL OVER 24 HOURS
FIRST ATTEMPT

• Designed to fit on aircraft pallet and into cargo plane door
• Built in pumps and filtration
• Removable panel style lid
• Horizontal baffles system to keep slosh reduced
• Then I hired an engineer…
FINAL TRANSPORT CONTAINER PLAN

- 4 pumps. One in each corner behind a false wall
- 2 of these pumps went to mechanical filters built into the chimney
- The other 2 pumps went oxygen supply
- 2 battery banks of (6) 12 V batteries plus redundancy banks
- 1 oxygen concentrator plus additional backup unit
PLANNING AND PREPARATION

1) Shipper

2) Forwarder

3) Airline
DRY FITTING TO ENSURING EVERYTHING FITS ON THE AIRCRAFT PALLET
FITTING THE TRANSPORT CONTAINER ONTO THE ROLLER BED TRUCK AND SECURING
CUSTOM EQUIPMENT TO ACCOMMODATE HEIGHT OF CONTAINER ON TOP OF TRAILER
# EQUIPMENT MANIFEST

- **(24)** 12 V GEL CELL BATTERIES
- **(2)*** OXYGEN CONCENTRATORS AND CHARGERS
- **(2)*** BATTERY CHARGERS (NOT USED DURING FLIGHT)
- **(5)*** 1500 GPM RULE PUMPS FILTER
- **(4)*** SCREWDRIVER PHILLIP AND FLAT
- **(1)*** CRESCENT WRENCH
- **(2)*** DISSOLVED OXYGEN METER
- **(1)*** OXYGEN ANALYZER
- **(2)*** PH PEN
- **(3)*** UTILITY KNIFE
- **(2)*** CHANNEL LOCK WRENCH
- **(2)*** PAPER TOWEL
- **(200’)*** AIRLINE TUBING
- **(1)*** TEFLON TAPE
- **(6)*** AIR STONES
- **(1)*** PH TEST DROP KIT
- AMQUEL
- SODIUM CARBONATE
- **(1)*** AMMONIA TEST KIT

- **(2)*** SILICONE
- **(1)*** SILICONE DISPENSING DEVICE
- **(3)*** FLASHLIGHT
- **(1)*** WEATHER STRIPPING
- **(1)*** GORILLA TAPE
- **(50)*** STAINLESS STEEL SCREWS
- **(10)*** 3/4” BOLTS, NUTS, WASHER
- STRAPS TO RETAIN CARGO
- **(4)*** “T” FOR AIRLINE HOSE
- **(10)*** BARB CONNECTORS AIRLINE HOSE
- ZIP TIES
- MEASURING CUPS
- SPOONS
- **(10)*** MIXING CUPS AND LIDS
- **(1)*** ALKALINITY TEST KIT
- **(1)*** FUNNEL
- **(1)*** TEST WATER EXTRACTING DEVICE
- MSDS SHEETS AS NECESSARY
- SHARK MEDICATION KIT
  - SODIUM BICARBONATE SOLUTION
  - DEXAMETHASONE SODIUM
  - PREDNISOLONE ACETATE
  - AMIKACIN
  - DOSAGE SHEETS FOR MEDICATIONS
  - B12 VITAMIN
  - SYRINGES

- **(1)*** MANTA STRETCHER
- **(8)*** LOCKING CARABINERS
- **(4)*** EXTENSION ROPE FOR STRETCHER
- SPARE ELECTRICAL WIRE
- ELECTRICAL WIRE TERMINATION KIT
- **(2)*** ELECTRICAL TAPE
- **(2)*** 1” HOSE BARBS
- **(10’)*** 1” FLEXIBLE HOSE
- **(1)*** DRILL BIT SET (INCLUDING 3/4”)
- **(1)*** DRIVER SET
- SOCKET WRENCH SET
- **(2)*** EXTENSION CORDS
- **(1)*** HONDA EU2200I GENERATOR (NEW IN BOX - NONHAZARDOUS) (NOT USED DURING FLIGHT)
- SPARE NYLON BOLTS FOR PUMP PANELS AND CONTAINER LID
- COASTAL SOURCE TERMINATED WIRES
- **(2)*** 31,000 POUND STRAPS
- **(1)*** REGULAR STRAP WITH HOOKS
- **(1)*** 30,000 POUND SHACKLE
- EXTRA NUTS AND BOLTS FOR TERMINAL BLOCKS
- PIGTAIL TO CONNECT BATTERY CHARGER TO PUMPS
- **(2)*** EXTRA PAPER FILTERS
- **(2)*** EXTRA PAPER JACUZZI FILTERS
- **(4)*** EXTRA ACTIVATED CARBON FILTERS
- **(1)*** MASK TO LOOK IN WATER
- **(2)*** CHAINS TO REMOVE BAFFLE BOX
- **(4)*** FEMALE PLUGS FOR PUMP WIRES
- SHRINK WRAP
- **(2)*** TARPS
DAY OF SHIPMENT – TRUCKING TO AIRPORT

- Load water and strap transport container to pallet and to truck
- Raise DO to 150% with oxygen concentrator powered by generator, ensure water chemistry is at desired set points
- Load animal / injections – transport clock starts here
- Trucking from Dynasty to Miami International airport (hours 1-4)
- Final preparations prior to airline accepting container (hours 4-5)
- Loading into aircraft in preparation for flight (hours 5-9)
DAY OF SHIPMENT
- AIR FLIGHT

- Total flight time 9 hours (hours 9-18)
- Monitoring pH, DO, ammonia
DAY OF SHIPMENT – TRUCKING IN EUROPE

- Clearance of documents into the EU (hours 18-20)
- Trucking from AMS to Nausicaa (hours 20-26)
- Final acclimation and moving animal into tank
THANK YOU

- **Nausicaa** – Philippe Vallette, stephane henard, Dominique MallevoY, Renaud Herbert and the rest of the team
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- **The Georgia aquarium** – chris coco, chris Schreiber, Tonya Clauss, & Team
- **Ripley’s aquariums** – Joe Choromanski
- **De jong marine life** – Jeffrey de Pauw and the rest of the team
- **Four Star Cargo**