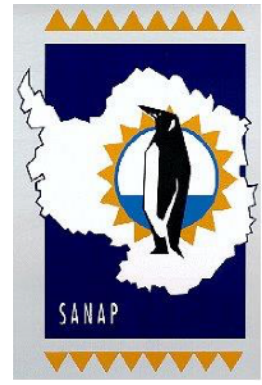




# 71° Below

SANA E 57 Newsletter  
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As I alluded to on the previous newsletter we have been experiencing some pretty extreme conditions out here, which is not surprising. One of the biggest challenges have been with the helicopters which we rely on for a significant amount of logistical support. There is also a serious amount of activity at the base itself with the upgrades and repairs. However, currently I am on the ship again while we are refuelling and so I will take this opportunity to go into some detail of this amazing ship and how we supply the base, which is 170km away across the ice!

## The SA Agulhas II

The SA Agulhas II is a polar supply and research vessel that was specially commissioned by the SA antarctic programme in order to service the three bases that SA has in the southern oceans. The design specifications were very broad and there were many parameters that needed to be taken into account. She needed to be a cargo vessel, a fuel tanker, an ice-breaker, a passenger ship, a helicopter base and also must have a space set aside for the scientists to work...and all this while sailing in some of the roughest oceans on earth! This is a lot for a single ship to do, yet she manages all these tasks very capably!



The SA Agulhas II was designed and built in Finland, where they know a thing or two about polar research and ice! She is 134m long, 22m wide (at her widest). Mid-ships are the main decks. Deck 5 is where people board her up a long gangway that goes down to the harbour. Deck 5 is the main accommodation deck, which also has the clinic and the purser's office. Aft on deck 5 there is also the helicopter briefing room, the double hangars for the two helicopters, and the helipad. Deck 4 has some passenger accommodation, as well as the dining saloons, auditorium, laundry, gym and sauna. There is also a business centre for the scientific teams to use the internet and printer/scanners etc. Deck 3 is basically crew accommodation and the scientific areas. Below this are the engineering levels with the engines and other life support systems.

Deck 6 and 7 are passenger accommodation and some social areas and the bars. Deck 8 is officer accommodation and offices. Deck 9 is the bridge. Above this are the outside decks which are used for observations of various sorts. There are bird and animal observations that are done throughout the voyage. It is amazing that there are so many birds that live and thrive in these harsh conditions! Ice observations are also taken while we are in ice. The ice observations are used to navigate, as well as assess the impact of the ice on the ship by using special sensors attached to the ship structure.

Forward of the main decks is the cargo area. Here the ship has it's own fuel supply (enough to travel all the way down here, operate in these waters, and travel back!). There are also two big tanks of polar diesel, enough to supply the whole Antarctic base for the whole winter. This is

approximately 460 000L! This diesel has special additives that prevent it from freezing solid. It is used at the base for the bulldozers, tractors and the actual generators that make life for humans in this harsh environment possible and even comfortable!



Other than the fuel bunkers there are also several holds for cargo. These are used variously for big shipping containers, vehicles (being returned to the base after being serviced in SA), petrol drums for the snowmobiles, and construction equipment being used at the base for the upgrades. There are several cranes of different sizes to move all this onto the ship and also around the ship.

All this while travelling through rough seas and thick ice! She's quite a piece of machinery!

## Ship Tour

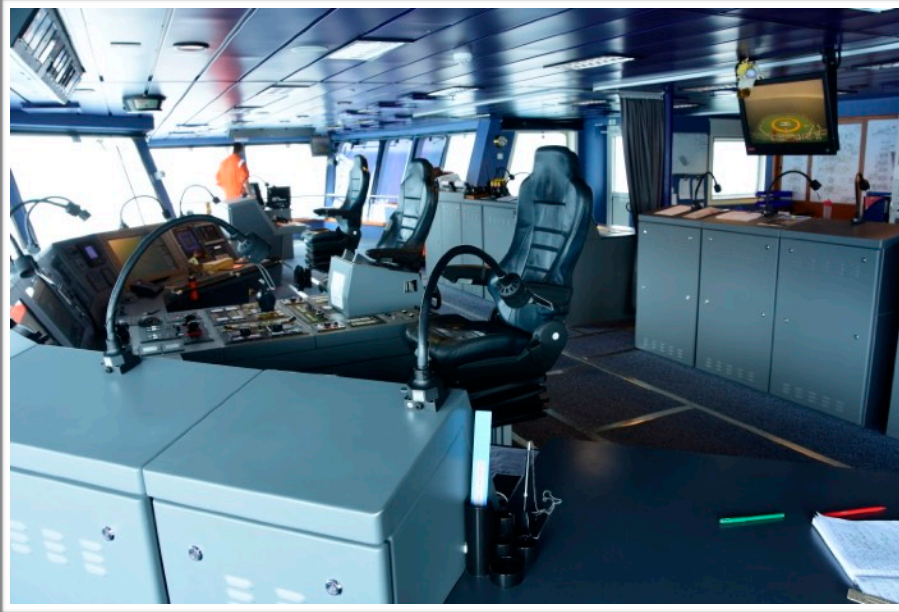
The SA Agulhas II, on top of all its other tasks has to accommodate a whole group of people for several months. Some will leave early on and head to the base, while others are ships crew or oceanographers that will stay on the ship almost permanently during the voyage. This means that food and water need to be provided, the ship needs to be heated in those cold climes, and waste must be disposed of safely and in an environmentally friendly manner. All these functions occur in the engineering decks of the SA Agulhas II, which are below deck 3.

The engines that power the vessel are truly impressive. There are 4 huge diesel engines that provide electricity for the whole ship, as well as the electric motors that turn the propellers. The engines are run according to need, so while the ship is stationary only one engine is needed. Once underway, depending on speed, sometimes all 4 are running simultaneously. When breaking through ice all 4 engines are needed. The engines can also be serviced or repaired while at sea, so the ship can still sail while an engine is worked on.



The heat from these enormous engines needs to be dissipated, so much of it is used to heat the water that goes to the passenger areas of the ship. The ship makes its own potable water from sea water using a reverse osmosis plant, also located in the engine bay. Waste water from the showers and toilets is passed through a biological membrane system. This highly effective system takes all the ship's waste





water and makes clean water that can be discharged overboard, and a biologically active sludge. Depending to the rules governing the waters in which the ship is sailing the sludge can either be treated until it is inactive and then discharged overboard, or it can be kept in barrels and taken back to SA for disposal. It makes excellent fertiliser, apparently.

There are also systems to keep the ship stable in rough weather, ballast tanks that are monitored

automatically to keep the ship horizontal. All these functions are monitored from the engine control room and the bridge, with redundant systems built in in case of a malfunction. Everything has been taken into account, which is a relief when travelling to some of the remotest oceans in the world.

The bridge itself is hugely impressive! It has a commanding view over the front of the ship and the cargo areas and the main crane, which is used for unloading and all the cargo work that gets done. All the functions of the ship are visible and controllable from here.

The ship is also highly advanced, with very modern features that make it more comfortable and safe. It has a Dynamic Positioning System, which uses GPS data and gyroscopes, along with the bow and stern thrusters, to keep the ship in one position. This is useful for many things, like deploying the heavy buoys that are dropped from the science areas, cargo work, or even just staying put overnight while waiting to start the next days cargo work. There is also a stability system that uses valves and huge cylinders filled with sea water to keep the ship stable while in rough seas. It is also used to keep the ship level when unloading heavy containers. The ship would lean quite heavily when the crane moves a 10 ton container over the side. This system makes sure that doesn't happen.

Maritime traditions are also upheld, despite the brand new ship and state of the art systems. When meals are ready one of the bridge officers plays a small tune on a xylophone, which is a tradition dating back to the original Agulhas !!

All in all, this is an incredible ship that is designed to operate in the harshest environment on earth. The competent crew delivered us all to the ice with all our cargo. Then they turned around and headed back to South Africa, via South Georgia and Bouvet, to get ready for the next voyage.



## Our Sponsors

A huge thanks to our sponsors who generously donated some of their quality products to the overwintering team to make our winter more homely! We will keep everyone updated as we get a chance to sample these delicacies! Currently, however, we all live in a construction site with 30 construction workers. We will break out the delicacies when we are finally alone in our new home!

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