Thrust project
Why are we excited about super-cavitating hydrofoils?

Butch Dalrymple-Smith, Colin Hales, Matthew Kear and Dick Barton:

BUTCH DALRYMPLE-SMITH: The the reason why I got involved is because I'm perhaps better known for hydrofoils than I am for motorboats. And I felt that this project would be much better off with hydrofoils because they would be a lot safer than the hydroplane concept, which is what all the record Breakers have been recently.

And I feel quite strongly that hydroplanes are all right up to about 300 miles an hour, but above that they're almost impossible to control. And I told Richard that control is probably more important than speed because if you, it doesn't matter how fast you go, if you lose control, you'll crash the boat and the whole thing will be a disaster, whether or not you you go fast or you know, it's the control is vital. And the difference is that a hydrofoil picks up it's lift from below the surface, so that's where the water is stagnant and stationary.

So it doesn't get disturbed by waves, it doesn't doesn't worry about, you know, wakes or anything like that. The boat if it's properly controlled, it can carry on straight irrespective of the condition of the water surface. The other thing is that when you apply the power of a jet engine, because the line of the thrust is considerably higher than the drag of whatever it is in the water, you get a bow down pitching moment. And in a hydroplane, there's not much you can do about that, the whole boat is going to go bow down a bit.

In a hydrofoil, on the other hand, you can correct for this and keep the boat level that doesn't really matter so much when you're running with the motor, with the jet engine. But when you cut the engine, a hydroplane will suddenly pitch, bow up.

And there's a lot of people who felt that was actually the problem that Donald Campbell had which caused his backflip and the the loss of his boat.

So being able to keep the boat level irrespective of the amount of power that you're applying is really fundamental to control of the boat.

COLIN HALES: My name is Colin Hales and I'm a aeronautical engineer, so I have many roles. One of them is safety, overall safety, making sure that the craft is universally safe to operate.

But my main role is I know quite a bit about jet engines and so I'm responsible for maintaining and making sure that the jet engine operates correctly.

I understand aerodynamics and you've got subsonic craft, you've got supersonic craft like Concorde. These foils are acting like supersonic aircraft in water. And so that just blows your mind, in the case here. If it works, it's going to be fantastic.

MATTHEW KEAR: I think my favourite innovation for this project has to be the one that sort of enables or gives this project it's life, it's shot at working and that has to be the super cavitating hydrofoils. So what does that mean?

That is the so the control surfaces that sit under the water, they are designed especially so that they can exceed the speed what is currently thought to be the speed limit of what are called hydrofoils.

And the design that has been come up with is very novel and it's really challenging preconceived notions as to how this stuff works. And that is critical to enabling a hydrofoiling boat like this to go as fast as it does.

DICK BARTON: The whole part of this project is to go into a realm that's unknown and that's where the hydrofoils come in. When you go into super cavitating hydrofoils, all the fluid dynamics says it will work, but until you actually prove it, do it, then it's just theory.

We have to make it practical and that's the best thing. The thing that sucks you into this project, something new.