

Heat Ranger Ltd  
40E Thackeray St  
Hamilton 3204  
New Zealand

ph 07 838 0477

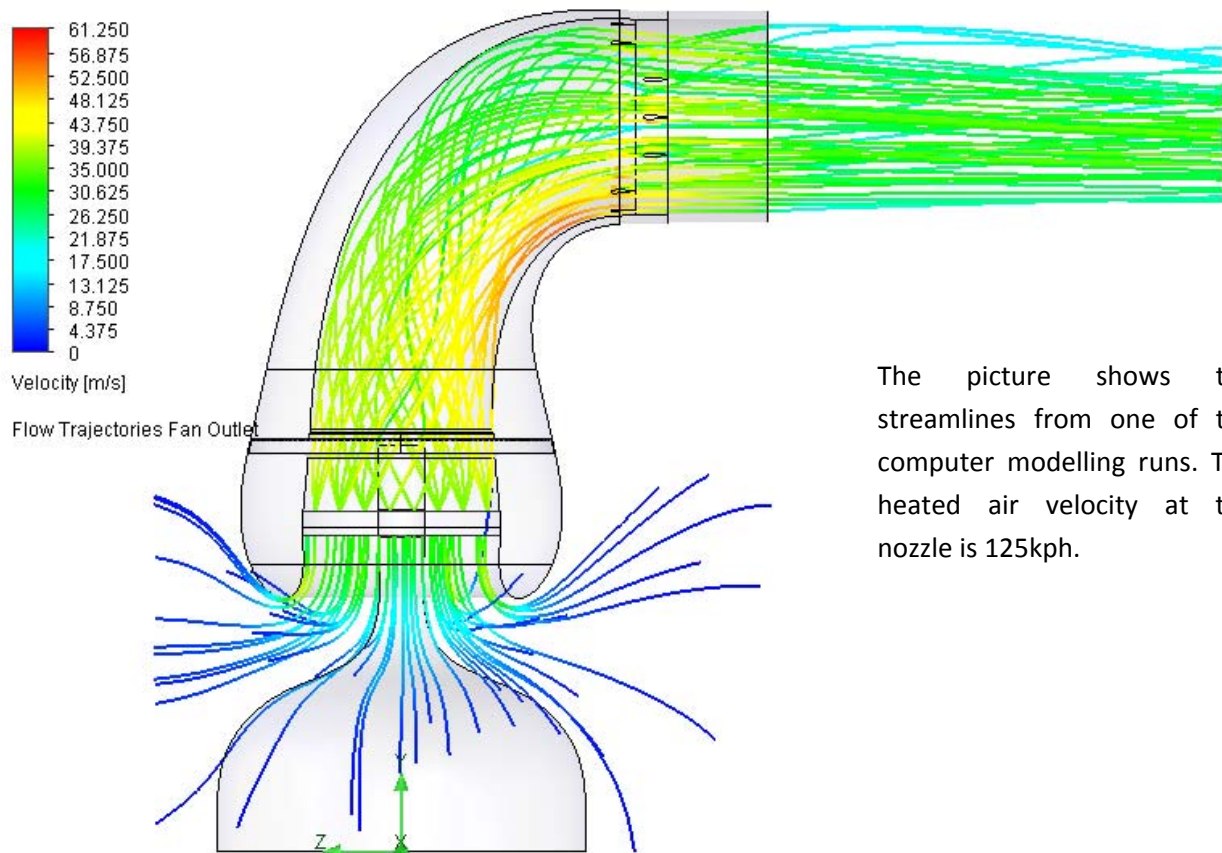
## May 2014 update #5

### Summer work

We have been pretty busy over the summer off season despite the lack of frosts

We have been focussing our efforts on improving the airflow from the single nozzle by 20% and increasing the gas flow and heat output from the burner. We expect the net effect to increase the radius of influence and or enable us to generate higher temperatures. Either way we believe that the machine is just about as efficient as we can make it. The extra air has meant about a 2% increase in power to drive the fan because we are using a higher blade pitch and slightly lower speed to get more efficiency from the fan.

We have also opened the nozzle out more, reduced our curvature and redesigned our straightening vanes to improve their aerodynamics, all of which has taken a lot of computer time and made possible because we had base data from our November testing to validate the modelled values.



The picture shows the streamlines from one of the computer modelling runs. The heated air velocity at the nozzle is 125kph.

While it is quite technical the predicted gains were such that we drew a line and decided that the improvements were worth the redesign. We have commissioned new moulds for the top half of the machine. While this has put our production programme back, we have decided to upgrade the both the

***Leading the Revolution in Climate Management Systems***

development prototype and to incorporate all of the enhancements in the production model which will be out in the last week of June and heading to Cromwell to evaluate on the local cherry orchards. While we had hoped to have it ready for the Summerfruit conference, production schedules just could not be condensed to achieve that. Nonetheless Bruce Koller will be at the conference and able to answer any questions

### **Autumn winter testing**

The refurbished Prototype is due back at Broadacres in Canterbury by the middle of June and ready for frost testing. The cooler temperatures over the last three weeks may not be everybody's cup of tea but we are keeping our fingers crossed that we will see a few more cold nights in June to enable us to have a good work out. Having the machine working in frost conditions is what we are all about so that we can provide you with reliable performance data so that you can have confidence when considering your climate management options.

We know the earlier configuration was giving us a radius from the machine of warm air beyond 210m. How far it goes and how warm it is, we are determined to quantify before the end of June. While we are happy that black currents and grapes are likely to have similar drag coefficients, when it comes to keeping the warm air close to the ground, it will certainly be different for higher tree crops such as cherries, which is why we are taking the first production machine to Cromwell. We would anticipate a shorter radius, but we do have the option of setting the machine higher off the ground to offset the tree height.

### **Gas Supply**

This has been an interesting challenge. In the southern half of the South Island LPG is normally supplied in 45kg bottles compared with the 210kg bottles we are using in Canterbury. If you typically need protection for 12 hours then you will need 8 – 12 of the 210 kg bottles. With 45kg bottles that means 50 – 60 bottles together with a series of manifolds that gets to be a major job unless you have a dedicated trailer and can run them back to the nearest depot to get then refilled (complete with your dangerous good licence).

We have been in discussion with two of the gas suppliers to work through the options and expect to get some sensible options sorted over the next couple of weeks. Because any fuel including LPG is regarded as a dangerous commodity, when large volumes are being stored in any one place, any user needs to have a site approval to store and use the gas. This is normally arranged by your gas supplier and that supplier needs to be pre warned of your situation if you are looking to use Heat Ranger. We can also give you some guidance in this respect.

Because it is very difficult to design an acceptable burner for oil or diesel to meet the aerodynamic needs of Heat Ranger, we have stayed with LPG gas. It is also cheaper as an energy source and cleaner burning.

### **Suggestions from Growers**

We have visited a number of winegrowers over the summer to check out options for those difficult situations where windmills and helicopters just do not seem to provide an acceptable level of protection. In some cases growers just do not want windmills whatever reason, be it aesthetics, noise, or an unreliable or non-existent inversion layer.

Well we think that we can solve most of those issues, even with grapes planted with narrow row spacings, where straddle tractors are used. The other common question has been, could we have a Heat Ranger that has its own engine and fully automated, well that's two questions really and the answer is yes to both.

We will be producing a Heat Ranger that has its own LPG powered motor, which will still be able to be picked up and moved with your three point linkage or a forklift.

The Winegrower magazine provided a good story on progress but before we had completed the last modelling runs so the picture in the article, while close, does not show the full length of the nozzle. We will have some new pictures for you shortly but at present can only show you the new moulds coming together.



### Demonstration sites

In the last two weeks of June we will be frost testing at Broadacres Black Currants at 295 Brookside and Burnham Road, Leeston and you can find it on Google Earth by typing in that address or by going to [www.Heat-ranger.com](http://www.Heat-ranger.com) and

About Us

Partners

Harvest : use the link and [click to enlarge Map](#) on the top right of the page to see where the control mast is in the field. If you want to visit go down Selwyn Lake Road, do not attempt to cross the Selwyn River at the Ford.

This will enable us to see how much more heat and area we are getting from the improvements made over the summer and compare this with our base information.

At the end of June we will be in Cromwell with the first production Machine and in early July we will be taking the machine from Broadacres up to Marlborough. We will keep you posted on this as we go.



Fred Phillips

Project Manager

31 May 2014