



# QUIETS:

By Michel Garneau

## A different type of REvolution



Though they chose a more “traditional” approach than their colleagues at McGill in terms of forging ahead with development of a “clean” snowmobile, the QUIETS team, from the École de technologie supérieure (ETS) in Montreal, have nonetheless pushed the technological envelope in terms of

development and achievement.

Alexandre Jutras, the president of the group, explained how the QUIETS club was launched in January of 2003 with an eye to competing in the 2004 CSC. Alex and his fellow club members immediately began working on a 2003 Ski-Doo MXZ 600 HO with the objectives of making it cleaner, quieter, and more fuel efficient. Another underlying goal was to develop modifications that could easily be adapted to an ordinary enthusiast’s sled.

### Year 1

On the engine side, the (pre-SDI) powerplant was first stripped of its carburetors and equipped with a throttle body system out of a Honda Civic. A “Y” manifold was crafted to feed both cylinders with fuel being fed by individual injectors located in the intake tracts. A Haltech electronic controller was added to work with the stock MPPEM brain to control the injectors. Hours were then spent on a dynamometer performing fuel mapping. In addition to the dyno readings, an exhaust gas temperature gauge was used to provide important data needed for this arduous task.

On the noise reduction front, an analysis of the stock muffler revealed that the chambers found inside were too small for optimal noise suppression. In its place a unique two muffler system was designed with one (located inside the cab in the more traditional position) being responsible for high frequencies and the other, located under the running boards, taking care of the lows. Tuning for chamber dimensions was done by trial and error. Insulation was also added in generous amounts to the body panels and cab area for better containment. The end result was a snowmobile that was on-par with its four stroke competition in total sound output. A remarkable achievement!

### Year 2

The 13 members of the QUIETS team immediately began working on fitting the 600 HO engine with an Orbital Direct Injection system sourced in part from a Sea-Doo watercraft. Extensive modifications to the existing cylinder heads had to

be carried out to make room for the injectors. Unlike the E-TEC that we looked at in last month’s issue, the Orbital system uses two circuits, one for compressed air and the other for the fuel. Powering the custom-made air pump was achieved by modifying the magneto side of the crankshaft



to accommodate a pulley. The carburetors were re-installed, although their sole function now was to control air intake alone. This change also allowed the throttle position sensor to be used as an input for fuel mapping. With the hardware in place, work began on programming the electronic brain responsible for babysitting this complex system. This again meant hours and hours of dyno time. The end result was an engine that developed 106 hp, responded well to throttle input, and kept the same operating rpm. Perhaps more significantly, the engine’s exhaust ceased to be smoky, as well as losing its familiar two-stroke smell. One item that Alexander points out as making a significant addition to the new-found cleanliness of the engine was the decision to use Blue Marble oil.

The QUIETS team once again went back to the drawing board in search of an even quieter muffler design. The new set-up consisted of a center-dump expansion chamber which empties directly below into two separate chambers located on the underside of the snowmobile. This design netted an incremental improvement over the previous year.

Finally, efforts were made to improve efficiency and reduce fuel consumption. One set of idler wheels was removed in the rear suspension (which also helped reduce noise ever so slightly) and slides were fitted with a Teflon strip. This change alone resulted in a dramatic reduction in rolling resistance and friction.

So, what does the QUIETS team have planned for Year 3? Let’s just say it is more of the same. In other words, more ingenuity, creativity and innovation. To learn more about their exploits or contact them for possible sponsorship opportunities, please visit their Web site at <http://motoneige.etsmtl.ca>.