



University of Patras

Department of Mechanical Engineering & Aeronautics



Laboratory for
Manufacturing
Systems & Automation

Newsletter No.1

10/11/12'06



Returning from the student duties the UoP 2 team came back with a lot of anticipation for the completion of the last stage of our car: purchasing the final parts, manufacturing the remaining ones, assembling and finally testing the car. Lots of action and concluding studies had also taken place during this period. A description of work for each sub-team follows in the next pages.

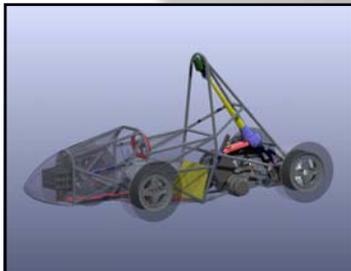
Something else that have been done during summer is the design of our new Team Logo which you can see on the upper right corner of this newsletter.

Chassis:

Our chassis main structure has been completed with the assistance of our Sponsor "Intrakat".



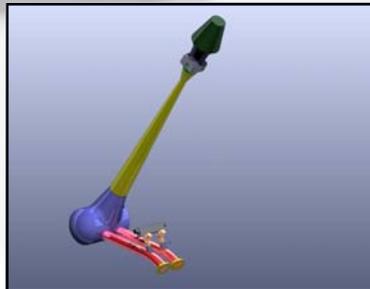
The crash zone remains to be analyzed thoroughly and constructed, while all the mountings for the required equipment are still to be determined.



Purchased parts
Completion percentile: 95%
Manufactured parts
Completion percentile: 80%

Powertrain:

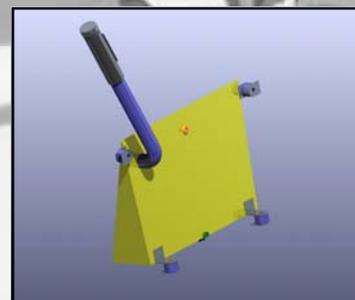
Given the fact of having chosen a single cylinder engine as driving unit, a part provided by our Grand Sponsor "Yamaha Motodynamics", internal modifications and improvements were considered a mandatory action. A new high-compression-oversized piston (compression ratio 11.75:1) has been installed for improving torque characteristic curve. Port polishing is another feature for minimizing losses during intake strokes. The camshaft was replaced by a new re-profiled one (285° duration) in order to meet track-use demands and give the desired output characteristics.



The intake design process is approximately 85% completed, and innovative manufacturing methods for its production are under investigation. For this part composite materials are deemed

mandatory. The necessary mold is going to be produced via rapid prototyping technology.

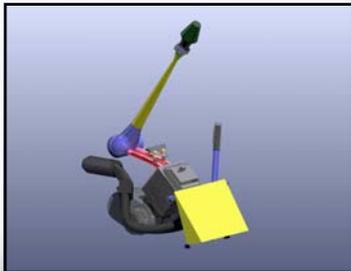
Regarding the intake and exhaust systems, a simulation model with all its initial parameters has been compiled using the Ricardo Wave model, provided by our sponsor "Ricardo". From this model our team expects to derive useful data for the optimization of the design and predict power output.



Fuel rail and fuel tank designs have been finalized and our team is about to start construction. The fuel tank volume has been defined according to the engine's original specifications with taking into consideration the increased fuel consumption due to necessary modifications.

All engine electronics have been acquired (ECU, injectors, sensors) in special prices from our sponsors "Haltech Australia" and "RS electronics". The wiring design, that integrates all the required electronic features of the car, is currently under elaboration.

Regarding the exhaust system, the concept has been fully determined, the required pipe lengths and diameters have been calculated using the Ricardo Wave model, while the muffler was kindly donated by our sponsor "Yamaha".



Purchased parts
Completion percentile: 95%
Manufactured parts
Completion percentile: 20%

Drivetrain:

The transmission system has been entirely designed. The differential was purchased in a special price from "Torsen USA", another of our sponsors.



The rear sprocket was provided by "Yamaha Motodynamics". Among the list of parts remaining to be purchased lie the CV-joints, the

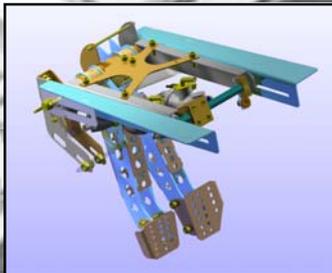
chain and the appropriate bearings.

Purchased parts
Completion percentile: 75%
Manufactured parts
Completion percentile: 10%

Brakes:

Studies on the braking system have been concluded. Physical and technical aspects of the racing dynamics have been evaluated.

After taking into consideration the valuable feedback from last year's competition judges, new smaller and lighter AP master cylinders were chosen, something that led to a partial pedal system redesign. At the moment the size of the calipers has been fixed but their acquisition still remains.



So far we have at our disposal the brake discs, sponsored by "Brake Shop" and the master cylinders. The finalized design of the pedal system is going to be constructed in house by laser-cut and formed aluminum sheet. The construction will take place in the near future.

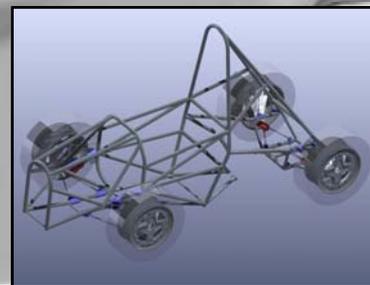
Purchased parts
Completion percentile: 65%
Manufactured parts
Completion percentile: 0%

Suspension:

After an arduous market survey an appropriate set of rims that meet our requirements and are also available in Greece was found. More-

over, the coilovers have been ordered and now only the calculation and purchase of the spring are pending. "Silverstone" who is the sponsor of our tires, has already provided us a first set, which has been fitted to our new rims in order to have an exact measurement of their size, something that will facilitate the appropriate suspension characteristics.

The mounting positions of the wishbones have already been defined. The uprights have to be designed for the whole system to be completed. The upright design will facilitate their manufacture from laser steel plates that will be then bent and welded together to form the desired 3D geometry. The upright design can not be finalized until all necessary brake system components have arrived, because a precise position of their mounting points need to be



determined. The steering rack has already been purchased along with the tie rods. Once the upright design has been finalized, the tie rod mounting positions will be fixed.



Purchased parts
Completion percentile: 65%
Manufactured parts
Completion percentile: 0%

Composite materials:

All the required equipment for vacuum assisted resin transfer molding procedures was purchased during summer.

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The first tests to define the

required process parameters such as catalyst to resin proportion, vacuum level etc. were conducted during September and October. Our first actual successful result was the production of an engine trumpet, achieving a 23% compared to an identical part made with the hand lay up technique.

Class 3 team:

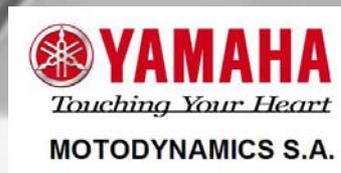
A new team with young members from the second and third year of studies has been formed in order to begin the design of our following car, UoP3. The new members were given guidelines and all the required feedback from our previous car designs in order to start thinking about how to incorporate all successful solutions and new innovative ideas that will render our new car lighter, faster and all-in-all a better car.

Formula Student Competition News:

After six successful events, held in Bruntingthorpe Proving Ground which is about 8 miles south of Leicester, Formula Student moves at the legendary Silverstone Circuit on 12-15 July 2007. IMechE President, Alec Osborn, who himself worked on the design of the famous BRM p139 F1 car in the 1960s, said: "This is great news for all the FS teams, giving them access to some excellent facilities and the chance to drive on one of the most famous circuits in the world." Formula Student remains to be Europe's largest student motorsport event and the move to Silverstone will be a fantastic improvement for all.

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Grand Sponsors:



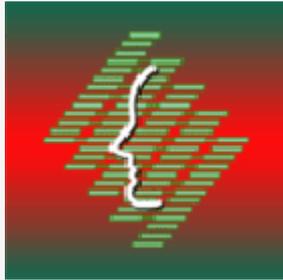
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