

"Actitud" Rocket

The idea of having a rocket to lift student's payloads, to provide a good show and to reach heights of between 800 and 1000 meters with low accelerations was an old project .-

Getting a kilometer height does not seem as a big deal, is a height that appears modest and relatively easy to reach with an amateur "candy" rocket motor.- In fact, many, many amateur rocketeers have done that with some preparation.-

So, the real challenge is to reach those heights, but with moderate acceleration (ideally, in the order of 10 to 12 g, maximum) .- "Candy" powered rockets should be clearly the alternative as a favorite one for its excellent cost / quality ratio, it seems to be possible to get good power at affordable prices, it delivers excellent performance and has that classic and characteristic smoke, for the "show"... But if it is necessary to lift a payload of between 250 and 300 grams, is complicated to achieve low accelerations with a candy rocket.-

So, the alternative of a two-stage rocket with a BP motor in the sustainer and a bigger candy in the booster could be the solution, as the idea was to "flatten" the curve of thrust, distributing the effort between two stages .-

Project Goals:

In this case, our goals were:

- Use a relatively safe candy rocket motor as booster, with low probabilities of faults or cracks in the combustion chamber, nozzle expulsion, etc.; it must be a very proven design, and because of that, we choose the GOD H-86 rocket motor, a real "veteran of space" for most of us.
- Being able to combine this candy motor with a commercial engine to avoid -in some configurations- having to use electronic recovery

systems in the second stage;

- To use in the first stage a design consisting of an electronic timer , a "step-by-step" system that can detect an event and control other events (in this case, it makes the detection of takeoff, then "wait" some time to ignite second stage, leading to interstage separation, and finally manages the ejection of the parachute of the first stage.- In the final version, the rocket will use a digital timer microprocessor developed and built in ORT Schools;
- To be able to put a student payload of 200 to 300 grams (a so-called "CanSat") at a height of 800/1000 m with a rocket that allows us to give a good show, with mild accelerations and a at low cost and risk.

Finally, the idea was to attempt the recovery of complex loads relatively easily because of the height at moderate altitudes.- We also want to use the system on student experiences and to train younger ACEMA members, less experienced in these operations, and use the whole system to train them to participate as ground support staff on more ambitious projects.





ACTITUD --

**Meaning of the name "Actitud" (in plain english, "Attitude"):
Why that name?**

From Dictionary of the Royal Spanish Academy:
"ATTITUDE"

1. Mood manifested in some way.
2. Posture of the body, **especially when determined by the movements of the mind, or express something effectively.**
3. Posture of an animal for some reason when striking.

In Spanish, the word "Actitud" has a phonetic spelling similar to "APtitud" (in english, "Aptitud" means "Fitness")

So, for "Fitness":

1. **Ability to operate competently in a particular activity.**
2. Quality that makes an object is suitable, adequate or accommodated to some purpose.
3. **Ability and willingness for good performance or exercise of a business, an industry, art, etc.**
4. f. Adequacy or suitability for and retain employment or position.



An "attitude" matter:

Year 2005 has a difficult starting point for the Argentine rocketry fans, because we started without our normal airfield (we used almost exclusively some fields, at that time belonged to the club ALA, from Lomas de Zamora), due in part to the events of a fire in a disco named "CroMagnon" late 2004 and in part to a change of directives in the club we stayed; but besides that, both situations were reinforced by the behavior of some rocketeers that did not follow the simple instructions of the owners of fields.-

In addition, for those same periods had been going a number of shortcomings in the supply of raw materials for rocket motors, which made them scarce or malfunctioning.

So, it was necessary to address these two serious problems:

- 1 - Getting a new place to practice public model rocketry;
- 2 - Be able to reassure the manufacture of engines.-

Argentinean rocketry is a very small but industrious community, and we believe that our hobby should not be encouraging divisions; instead of it, is necessary to help to the common good and help those who work (even for free) for that common good.-

Instead of this, from late 2004 until August 2005, a small group of rocketeers began to publicly propose a series of out of place situations, which caused unpleasant discomfort to our small rocketry community; these problems were generated almost daily and for free. - Even in the midst of these complex and unnecessary argue, a handful of reputable fireworks from ACEMA (our association) honestly decided to keep working in spite of adversity and often with very limited financial resources; thanks to that and thanks to the effort of many people, we get new sites for our public launchings, we work on solving -perhaps permanently- the problems with the engines and, finally, we began this symbolic project, consisting of a series of two-stage vectors: our "Actitud" rockets.-

ACEMA - Cohete "ACTITUD"



In choosing that name we shuffled several possibilities, all related to a tendency that can be summarized by saying that we wanted to "pass the bad time", stating flatly and with the proposal to do things with a positive mindset, thinking that not everything depends on the power of a wallet, joining forces and wills to wield hollow words or questioning the honesty of well-meaning and hardworking people.-

In that way, we think names like "Esfuerzo" ("Effort") and even the very similar "Aptitud" ("Fitness") .- Finally, emerged "ACTITUD" ("Attitude"), as a summary of our way to approach our problems and challenges with a positive "attitude".-

The Project "Actitud" is now an idea which is a demonstration of what can be achieved simply through real teamwork and humility, without selfish ideas.-

Some facts:

- The motor used for the sustainer is an argentine, commercially-made BP motor named F-9, no longer manufactured; instead of it, the manufacturer CondorTec makes today a more powerful similar unit (same external size) named F-18, twice as powerful than it's antecessor.-
- The motor used in booster position is an amateur-class motor named GOD H-86, it is a "candy" type rocket motor, made by Guillermo O. Descalzo (hence, its name reflects the initials of the builder, "G.O.D."); it is made of stainless steel, burns potassium nitrate and sorbitol, with a burning time of a little more than a second, and is a H class motor.-
- With those motors, this rocket flies to an altitude of between 850 and 1000 meters and is capable of carrying a little payload made by students.
- The electronics used for staging (e.g., starting sustainer motor) and for later booster's parachute deployment was designed and made by students of ORT Schools (Yatay section, Buenos Aires, Argentina), as part of their technical training and classroom work.- This group of students was directed by Prof. Edgardo Baez.-

Actitud, Images & photos:

http://www.gdescalzo.com.ar/el_cohete_actitud.htm

Decals:

<http://www.gdescalzo.com.ar/documentos/ACTITUD/CALCOSACTITUD.pdf>

Please note that due paper size constraints (it's A4 type clear autoadhesive vinyl), the "actitud" word is designed in two sections, and it must be printed, clipped and carefully located in the fuselage

Art "visual" design and decal positioning:

<http://www.gdescalzo.com.ar/documentos/ACTITUD/Actitud.pdf>

Please note that red markings on fins and black strips on fuselage were made in autoadhesive vinyl

Flight Video, with audio:

<http://www.gdescalzo.com.ar/documentos/ACTITUD/ActitudRocket-Argentina.mpg>

RockSim 7.0 design file (with sizes and parts data):

<http://www.gdescalzo.com.ar/documentos/ACTITUD/ACTITUD-slm-acema.rkt>