

# EVOLUTIONARY TASK FORCE

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## SUMMARY OF WEEK 1

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Week 1 was the week of the kick-off meeting. This was a two days meeting with 10 attendees and ample time for detailed S/T deliberations. It was not only intellectually rewarding, but very productive too. The details are in the minutes (publicly available at <https://symbriion-ec.wikidot.com/>), here I will just briefly recap the main issues.

We agreed on the main subject (organism evolution), the general framework for organism evolution, and a couple of temporary assumptions to make the deadline of 15 February 2012 feasible. We postulated that an organism consists of a body and a mind (a shape and a controller) and that we are to evolve both of them. We agreed that the main reproduction mechanism works through the egg metaphor: an organism reproduces by transmitting its genetic code representing its shape and controller to an individual robot module (the egg). The fertilized egg applies some variation to this code (crossover with another organism's genome or mutation or both) and the resulting code is used to seed the birth of a new organism. Once the new organism is constructed, through the process of morphogenesis, it needs to undergo a process of lifetime learning to fine-tune its initial, inherited controller to its body shape.

The two temporary assumptions we made are: 1) we skip the stage of swarm to organism evolution and focus on the evolution of organisms only, 2) we ignore the issue of energy, assuming unlimited supply or zero consumption. Later on we will revise these assumptions.

Furthermore, we identified various technical questions and possible solutions for these. The main questions concern

- 1) the controllers of the organisms,
- 2) the process of morphogenesis and the genetic encoding of the organism shape,
- 3) the internal rewards for the "postnatal" adaptation process of a newborn organism, and
- 4) benchmarking the Robo3D simulator (max number of robots, speed, etc).

We agreed to spend a month with experimental comparisons of the existing alternatives and established a team for each issue. The teams are to make a detailed experimental plan by Friday 11 November and finish the comparisons by Wednesday 30 November. The benchmarking should be finished by November 16. This is a very tight schedule indeed, but the overall deadline of February 15 mandates rapid progress. We also stated explicitly that this research is meant to be published as soon as possible.

Last but not least, we agreed on our means of communication. We will have a discussion forum and a blog to keep the rest of SYMBRICATOR informed and involved. Furthermore, the Task Force will have a weekly meeting (skype or mumble) at a fixed date and time: every Thursday at 11am we discuss recent developments, account for progress, and specify further plans. Finally, Gusz, the task force leader, will publish a compact summary of progress every week and send it around by email as well as make it available on the blog.

For further details please consult: <https://symbriion-ec.wikidot.com/>