

GROUND-AIR TO ORBIT (GATOR) Launch Vehicle

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STAGE ONE:

Host carrier aircraft takes off under turbojet power, with partially filled main fuel tanks, and a full payload on the unfuelled GATOR.

STAGE TWO:

Carrier aircraft having achieved altitude at sub-sonic speed, now takes on fuel to top up its own tanks for remaining flight, and a full load of rocket fuel (methane) is also passed to the GATOR's tanks.

At this point, the GATOR is still half-loaded, as it still carries no oxidiser.

STAGE THREE:

As the carrier consumes its own fuel mass climbing to maximum ceiling with its air-breathing engines, the GATOR is filling up its own tanks with oxidiser by ingesting and liquifying the atmosphere through which it is travelling, so in effect transferring some of the all-up load to itself as the carrier lightens.

STAGE FOUR:

Once GATOR has completed filling its tanks, and the carrier reaches its maximum ceiling, separation occurs and GATOR's liquid fuel rocket engines fire to take it hypersonic. This should be more easily achievable at these altitudes with less drag and turbulence from the thin air.

STAGE FIVE:

The point of no return for orbital insertion commit depends largely on payload and all-up weight, which normally would be that cut-off point where there is enough fuel to achieve landing manoeuvres, without the danger of touchdown carrying a heavy load of dangerous inflammables, or significant re-entry heating.

STAGE SIX:

Orbital insertion to Low Earth Orbit (LEO), at 200 Miles/ 320 Km.

