CLAIMS

1. An iron-core linear motor forcer (100) with integrated aerostatic bearing guidance comprising
   (i) an iron-core (10) enclosed within an enclosure (13) having an upper surface (11) and a bottom surface (12), wherein the iron-core (10) is mounted with a plurality of coil windings (16), and a plurality of air supply channels (50) are provided substantially in vertical from the upper surface (11) to the bottom surface (12) of the enclosure (13), and each of the air supply channels (50) is terminated at the bottom surface (12) with one or more orifices (32); and
   (ii) a linear motor stator (20) having a stator surface (22);
   thereby a pressurized air being injected via the plurality of the air supply channels (50) into a magnetic air gap formed between the bottom surface (12) and the stator surface (22) of the motor stator (20) in creating a preloaded load-bearing air film (41), and the iron-core linear motor forcer (100) is frictionless moving on the motor stator (20).

2. An iron-core linear motor forcer (100) with integrated aerostatic bearing guidance comprising
   (i) an iron core (10) enclosed within an enclosure (13) having an upper surface (11) and a bottom surface (12), wherein the iron-core (10) is mounted with a plurality of coil windings (16;
   (ii) a plurality of hypodermic tubings (30) each having an internal volume, mounted on the bottom surface (12) and a plurality of orifices (32) connecting the internal volumes of the hypodermic tubings (30) with the bottom surface (12); and
   (iii) a linear motor stator (20) having a stator surface (22) ;
   thereby a pressurized air being injected via the hypodermic tubings (30) into a magnetic air gap formed between the forcer bottom surface (12) and the stator surface (22) to create a preloaded load-bearing air film (41) in the magnetic air gap of the linear motor stator, and the iron-core linear motor forcer (100) is frictionless moving on the motor stator (20).

3. The iron-core linear motor forcer (100) as set forth in Claim 1 or Claim 2, wherein the bottom surface (12) of the forcer (100) and the stator surface (22) have flatness.

4. The iron-core linear motor forcer (100) as set forth in Claim 1 or Claim 2, further comprising a top abrasion resistant layer (121) on the bottom surface (12) and a bottom abrasion resistant layer (21) on the stator surface (22).

5. The iron-core linear motor forcer (100) as set forth in Claim 1 or Claim 2, wherein the stator (20) contains an array of permanent magnets, and the iron core (10) moves in relation to the stator (20).

6. The iron-core linear motor forcer (100) as set forth in Claim 1 or Claim 2, wherein the stator surface (22) of the linear motor stator (20) and the bottom surface (12) are used as a running surface for an aerostatic bearing.

7. The iron-core linear motor forcer (100) as set forth in Claim 1 or Claim 2, wherein the preloaded load-bearing air film (41) is provided between the linear motor stator (20) and the bottom surface (12) of the forcer (100) running as to allow the linear motor stator (20) to run at the magnetic air gap, and the preloaded load-bearing air film (41) has a thickness ranging from 0.1 micrometer to 100 micrometer.

8. The iron-core linear motor forcer (100) as set forth in Claim 1 or Claim 2, wherein the stator surface (22) of the stator (20) has flatness and a finish.

9. The iron-core linear motor forcer (100) as set forth in Claim 8, wherein the stator surface of the linear motor stator (20) is acting as a guideway for the iron core forcer (100).

10. The iron-core linear motor forcer (100) as set forth in Claim 1, wherein the plurality of air supply channels (50) are disposed on the iron-cone linear motor forcer (100).

11. The iron-core linear motor forcer (100) as set forth in Claim 1, wherein the air within the supply channels (50) are compressed and released into the magnetic air gap between the bottom surface (12) and the stator surface (22) of the motor stator (20).