CLAIMS

1. A method for applying a coating on substrate, the method comprising:

placing the substrate into a chamber;

impinging an evaporant source in the chamber with a beam to generate an evaporated vapor cloud in the chamber; and

presenting a carrier gas stream to the chamber to disperse the evaporated vapor cloud;

deflecting the evaporated vapor cloud being moved by the carrier gas stream, wherein the deflecting is done with at least one vapor cloud modifier that disrupts a flow of the carrier gas stream that prevents an area of the substrate from being coated, and wherein the evaporated vapor cloud at least partially coats at the substrate.

2. The method of claim **1** wherein the at least one vapor cloud modifier is positioned to enhance the coverage of an area of the substrate by the evaporated vapor cloud.

3. The method of claim **1** wherein the at least one vapor cloud modifier comprises an airfoil.

4. The method of claim **1** wherein the substrate contains a non line of sight feature.

5. The method of claim **4** wherein the substrate is a multi-airfoil vane segment for a gas turbine engine.

6. The method of claim **5** wherein the coating is a thermal barrier coating.

7. A method for applying vapor deposition onto a substrate with a non line of sight or limited line of sight comprising:

providing a vapor stream in a chamber, wherein the chamber is below atmospheric pressure;

impinging the vapor stream with a working gas that provides a flow that transports the vapor stream;

modifying a flow of the working gas with a physical object that directs the flow to achieve a desired coating on the substrate, wherein the physical object that directs the flow prevents an area of the substrate from being coated.

8. The method of claim **7** wherein the physical object that directs the flow enhances the coverage of an area of the substrate by the vapor stream being carried by the working gas.

9. The method of claim **7** wherein the physical object has an airfoil shape.

10. The method of claim **7** wherein the substrate is a multi-airfoil vane segment for a gas turbine engine.

11. The method of claim **10** wherein the coating is a thermal barrier coating.

CLAIMS:

1. A method for applying a coating on a substrate (32), the method comprising:

placing the substrate into a chamber (24);

generating an evaporated vapor cloud (44) in the chamber;

presenting a carrier gas stream to the chamber to disperse the evaporated vapor cloud; and

deflecting the evaporated vapor cloud being moved by the carrier gas stream, wherein the deflecting is done with at least one vapor cloud modifier (36;46a,46b,48), the at least one vapor cloud modifier comprising at least one flow inhibitor and at least one flow modifier,

wherein the evaporated vapor cloud at least partially coats at the substrate, and

wherein the at least one flow inhibitor reduces coating coverage on a line of sight area of the substrate (32) and the at least one flow modifier increases coating coverage on a non-line of sight area of the substrate.

2. The method of claim 1, wherein the vapor cloud modifier (36;46a,46b,48) disrupts a flow of the carrier gas stream.

3. The method of claim 1, wherein the vapor cloud modifier (36;46a,46b,48) is a physical object that directs the flow of the carrier gas stream.

4. The method of claim 1, 2, or 3, wherein the vapor cloud is generated by impinging an evaporant source (30) in the chamber with a beam (28).

5. The method of any preceding claim wherein the at least one vapor cloud modifier (36;46a,46b,48) comprises an airfoil.

6. The method of any preceding claim wherein the substrate (32) comprises a non-line of sight feature (13); preferably wherein the substrate (32) is a multi-airfoil vane segment for a gas turbine engine.

7. The method of any preceding claim wherein the coating is a thermal barrier coating.

8. The method of any preceding claim for applying vapor deposition onto the substrate (32) with a non-line of sight or limited line of sight.

9. An apparatus for applying at least one coating on a substrate (32), the apparatus comprising:

a chamber (24), wherein the chamber has an operating pressure below atmospheric pressure, wherein the substrate is present in the chamber;

an evaporant source (30) disposed in the chamber;

a beam generator for producing a beam (28) that impinges the evaporant source to generate an evaporated vapor cloud (44) in the chamber;

a carrier gas stream source for introducing a carrier gas into the chamber that transports the evaporated vapor cloud to coat the substrate; and

a vapor cloud modifier (36;46a,46b,48) that modifies a flow of the carrier gas to direct the deposition of the evaporated vapor cloud on to the substrate, wherein the vapor cloud modifier comprises at least one flow inhibitor and at least one flow modifier;

wherein the at least one flow inhibitor is configured to reduce the coating coverage deposited by the evaporated vapor cloud (44) on a line of sight area of the substrate and the at least one flow modifier is configured to increase the coating coverage deposited by the evaporated vapor cloud on a non-line of sight area of the substrate.

10. The apparatus of claim 9 further comprising:

a fixture (34) for positioning the substrate (32) in the chamber (24).

11. The apparatus of claim 10 wherein the fixture (34) contains the vapor cloud modifier (36;46a,46b,48).

12. The apparatus of claim 9, 10 or 11 wherein the vapor cloud modifier (36;46a,46b,48) has openings (58) for exhausting or introducing a portion of the carrier gas.

13. The apparatus of claim 9, 10, 11 or 12 wherein the vapor cloud modifier (36;46a,46b,48) is magnetized, charged, ionized, heated, or cooled.