CLAIMS

1. An antenna element comprising:

a first substrate having first and second opposing surface with a bowtie slot aperture provided in the first surface thereof; and

a plurality of Faraday walls disposed proximate the bowtie slot aperture, the plurality of Faraday walls including a first one and a second one of a plurality of Faraday walls, wherein the plurality of Faraday walls are symmetrically disposed about a longitudinal axis of the aperture with the first one of said plurality of Faraday walls forming a first set of tuning elements symmetrically disposed on either side of the longitudinal axis of said bowtie slot aperture and the second one of said plurality of Faraday walls forming a second set of tuning elements symmetrically disposed on either side of the longitudinal axis of said bowtie slot aperture.

2. The antenna element of claim 1, further comprising:

a second substrate bonded to the second surface of the first substrate having a first and second opposing surface; and

a feed circuit comprising a vertical launch extending from the first to second surface of the second substrate and a connected feed line on the second opposing surface of the first substrate disposed across a slot portion of said milled aperture.

3. The antenna element of claim 2, wherein the feed circuit is disposed between the first set of tuning elements and the second set of tuning elements.

4. An antenna assembly comprising:

a first substrate having first and second opposing surface with a bowtie slot aperture provided in the first surface thereof;

a plurality of Faraday walls disposed proximate the bowtie slot aperture, the plurality of Faraday walls including a first one and a second one of a plurality of Faraday walls, wherein the plurality of Faraday walls are symmetrically disposed about a longitudinal axis of the aperture with the first one of said plurality of Faraday walls forming a first set of tuning elements symmetrically disposed on either side of the longitudinal axis of said bowtie slot aperture and the second one of said plurality of Faraday walls forming a second set of tuning elements symmetrically disposed on either side of the longitudinal axis of said bowtie slot aperture;

a second substrate bonded to the second surface of the first substrate having a first and second opposing surface; and

a feed circuit comprising a vertical launch extending from the first to second surface of the second substrate and a connected feed line on the second opposing surface of the first substrate disposed across a slot portion of said milled aperture.

5. An array antenna comprising a plurality of antenna assemblies, each antenna assembly embodying the antenna assembly set forth in claim 4.

6. The array antenna of claim 5, comprising four antenna assemblies arranged such that a first set of tuning elements of a first antenna assembly and a first set of tuning elements of a

second antenna assembly are respectively adjacent to a second set of tuning elements of a third antenna assembly and a second set of tuning elements of a fourth antenna assembly.

7. An AMT process for fabricating a bowtie slot antenna, the method comprising:

(a) milling copper from a first surface of a double clad dielectric substrate to form an aperture;

(b) milling copper from a second, opposite surface of the double clad dielectric substrate to form a feed line for the aperture;

(c) bonding the double clad dielectric substrate to a first surface of a second substrate having a ground plane conductor disposed over a second surface thereof to form a bonded assembly;

(d) milling the bonded assembly to form a plurality of openings for a plurality of Faraday walls proximate the aperture, wherein the plurality of openings is symmetrically disposed about a longitudinal axis of the aperture; and

(e) filling the plurality of openings with a conductive liquid to form the plurality of Faraday walls.

8. The method of claim 7, further comprising milling the bonded assembly to form at least one opening for a vertical signal path and filling the at least one opening for the vertical signal path.

9. The method of claim 8, wherein the conductive liquid is a conductive ink.