CLAIMS

1. An antenna element comprising:

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

a plurality of ~~at least one milled opening and a~~ Faraday wall~~s, formed by filing the at least one milled opening with conductive liquid,~~ 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 wherein the at least one Faraday wall includes a first one and a second one of a plurality of Faraday walls.~~

~~3. The antenna element of claim 2, wherein said plurality of Faraday walls are symmetrically disposed about 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 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 said bowtie slot aperture .~~

2~~4~~. The antenna element of claim 1~~3~~, 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~~5~~. The antenna element of claim 2~~4~~, wherein the feed circuit is disposed between the first set of tuning elements and the second set of tuning elements.

4~~6~~. An antenna assembly comprising:

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

a plurality of ~~at least one milled opening and a~~ Faraday wall~~s, formed by filing the at least one milled opening with conductive liquid,~~ 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 first set of tuning elements symmetrically disposed on either side of said milled aperture;~~

~~a second set of tuning elements symmetrically disposed on either side of said of said milled 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~~7~~. An array antenna comprising a plurality of antenna assemblies, each antenna assembly embodying the antenna assembly set forth in claim 4~~6~~.

6~~8~~. The array antenna of claim 5~~7~~, 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~~9~~. 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~~at least one~~ opening~~s~~ for a plurality of Faraday wall~~s~~ proximate the aperture, wherein the plurality of openings is symmetrically disposed about a longitudinal axis of the aperture; and

(e) filling the plurality of~~at least one~~ opening~~s~~ with a conductive liquid to form the plurality of Faraday wall~~s~~.

8~~10~~. The method of claim 7~~9~~, 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~~11~~. The method of claim 8~~10~~, wherein the conductive liquid is a conductive ink.