CLAIMS

1. An antenna system (70) for Electronic Counter Measures, comprising a flat antenna array (71;80) of three or more sinuous slot antennas (712;81) arranged so as to form a triangular array lattice; wherein the flat antenna array (71;80) has a closed peripheral edge; wherein each sinuous slot antenna (712;81) includes a respective feeding structure (41) arranged on a bottom surface (713) of the flat antenna array (71;80);

the antenna system (70) further comprising a hollow metallic structure (73), which includes:

- a base (732) having a closed peripheral edge;
- a closed side wall (733) rising from the closed peripheral edge of the base (732) up to a given height (H) where said closed side wall (733) ends with a closed top edge; and
- a hollow (731) defined by said base (732) and said closed side wall (733);

wherein the hollow (731) is superiorly closed by the flat antenna array (71;80) whose closed peripheral edge is fixed on/to the closed top edge of the hollow metallic structure (73) and whose bottom surface (713) faces the hollow (731);

the antenna system (70) further comprising a foam spacer (72) which fills the hollow (731) and keeps the

sinuous slot antennas (712;81) spaced apart from the base (732) of the given height (H);

wherein the given height (H) is equal to a quarter of a wavelength corresponding to a central operating frequency of the antenna array (71;80);

wherein an absorbing sheet covers the base (732) on the bottom of the hollow (731), said absorbing sheet being designed to absorb surface currents on the base (732) on the bottom of the hollow (731);

and wherein, for each sinuous slot antenna (712;81), the hollow metallic structure (73) further includes:

- a corresponding reflecting tapered element (734), which protrudes from the base (732) through the absorbing sheet and the foam spacer (72) into the hollow (731), is arranged below said sinuous slot antenna (712;81), and is designed to reflect back-radiation from said sinuous slot antenna (712;81); and
- a corresponding feeding turret (735), which protrude from the base (732) through the absorbing sheet and the foam spacer (72) into the hollow (731) up to the feeding structure (41) of said sinuous slot antenna (712;81), and which is coupled with the feeding structure (41) of said sinuous slot antenna (712;81).

2. The antenna system of claim 1, wherein the triangular array lattice comprises two or more rows of

sinuous slot antennas (712;81);

wherein adjacent sinuous slot antennas (712;81) in one and the same row are spaced apart of a first distance equal to three halves of a wavelength corresponding to the lowest operating frequency of the antenna array (71;80);

and wherein adjacent rows are spaced apart of a second distance equal to seven sixths of the wavelength corresponding to the lowest operating frequency of the antenna array (71;80).

3. The antenna system according to claim 1 or 2, wherein the flat antenna array (71;80) includes a dielectric sheet having a top surface (711) and a bottom surface (713);

wherein the top surface (711) of the dielectric sheet is metalized;;

wherein each sinuous slot antenna (712;81) is made in a respective portion of the dielectric sheet;

and wherein the feeding structures (41) of the sinuous slot antennas (712;81) are formed on the bottom surface (713) of the dielectric sheet.

4. The antenna system according to any preceding claim, wherein the feeding structure (41) of each sinuous slot antenna (712;81) includes an end portion designed for 90° Radio Frequency transition;

and wherein each feeding turret (735) includes a

connection portion, which is designed for 90° Radio Frequency transition and which is coupled with the end portion of the feeding structure (41) of the corresponding sinuous slot antenna (712;81).

5. The antenna system according to any preceding claim, wherein each sinuous slot antenna (712) includes a respective sinuous slot structure (30); and wherein the sinuous slot structures (30) of different sinuous slot antennas (712) are not connected.

6. The antenna system according to any claim 1-4, wherein each sinuous slot antenna (81) includes a respective sinuous slot structure (82);

wherein the triangular array lattice comprises two or more rows of sinuous slot antennas (81);

and wherein the sinuous slot structures (82) of the sinuous slot antennas (81) in one and the same row are connected.

7. The antenna system of claim 6, wherein the sinuous slot structure (82) of each sinuous slot antenna (81) includes two sinuous slots;

and wherein the sinuous slot structure (82) of each sinuous slot antenna (81) adjacent to two sinuous slot antennas (81) in one and the same row has:

- the outermost cell of one of its two sinuous slots connected to the outermost cell of a sinuous slot of one of

the two adjacent sinuous slot antennas (81); and

- the outermost cell of the other of its two sinuous slots connected to the outermost cell of a sinuous slot of the other of the two adjacent sinuous slot antennas (81).

8. The antenna system according to any preceding claim, wherein the flat antenna array (71;80) is a planar or conformal antenna array.

9. A modular antenna system comprising several antenna systems (70) as claimed in any preceding claim;

wherein the antenna systems (70) are placed side by side thereby forming a modular antenna structure.

10. The modular antenna system of claim 9, wherein the side profile of each antenna system (70) is sinusoidal.

11. A phased array system for Electronic Counter Measures, comprising the antenna system (70) claimed in any claim 1-8 or the modular antenna system claimed in claim 9 or 10.

12. An Electronic Counter Measure system comprising the antenna system (70) claimed in any claim 1-8 or the modular antenna system claimed in claim 9 or 10.

CLAIMS

1. An antenna system (70) for Electronic Counter Measures, comprising a flat antenna array (71;80) of three or more sinuous slot antennas (712;81) arranged so as to form a triangular array lattice; wherein the flat antenna array (71;80) has a closed peripheral edge; wherein each sinuous slot antenna (712;81) includes a respective feeding structure (41) arranged on a bottom surface (713) of the flat antenna array (71;80);

the antenna system (70) further comprising a hollow metallic structure (73), which includes:

- a base (732) having a closed peripheral edge;
- a closed side wall (733) rising from the closed peripheral edge of the base (732) up to a given height (H) where said closed side wall (733) ends with a closed top edge; and
- a hollow (731) defined by said base (732) and said closed side wall (733);

wherein the hollow (731) is superiorly closed by the flat antenna array (71;80) whose closed peripheral edge is fixed on/to the closed top edge of the hollow metallic structure (73) and whose bottom surface (713) faces the hollow (731);

the antenna system (70) further comprising a foam spacer (72) which fills the hollow (731) and keeps the sinuous slot antennas (712;81) spaced apart from the base (732) of the given height (H);

wherein the given height (H) is equal to a quarter of a wavelength corresponding to a central operating frequency of the antenna array (71;80);

wherein an absorbing sheet covers the base (732) on the bottom of the hollow (731), said absorbing sheet being designed to absorb surface currents on the base (732) on the bottom of the hollow (731);

and wherein, for each sinuous slot antenna (712;81), the hollow metallic structure (73) further includes a corresponding feeding turret (735), which protrudes from the base (732) through the absorbing sheet and the foam spacer (72) into the hollow (731) up to the feeding structure (41) of said sinuous slot antenna (712;81), and which is coupled with the feeding structure (41) of said sinuous slot antenna (712;81);

the antenna system (70) being characterized in that, for each sinuous slot antenna (712;81), the hollow metallic structure (73) further includes a corresponding reflecting tapered element (734), which protrudes from the base (732) through the absorbing sheet and the foam spacer (72) into the hollow (731), is arranged below said sinuous slot antenna (712;81), and is designed to reflect back-radiation from said sinuous slot antenna (712;81).

2. The antenna system of claim 1, wherein the triangular array lattice comprises two or more rows of sinuous slot antennas (712;81);

wherein adjacent sinuous slot antennas (712;81) in one and the same row are spaced apart of a first distance equal to three halves of a wavelength corresponding to the lowest operating frequency of the antenna array (71;80);

and wherein adjacent rows are spaced apart of a second distance equal to seven sixths of the wavelength corresponding to the lowest operating frequency of the antenna array (71;80).

3. The antenna system according to claim 1 or 2, wherein the flat antenna array (71;80) includes a dielectric sheet having a top surface (711) and a bottom surface (713);

wherein the top surface (711) of the dielectric sheet is metalized;

wherein each sinuous slot antenna (712;81) is made in a

respective portion of the dielectric sheet;

and wherein the feeding structures (41) of the sinuous slot antennas (712;81) are formed on the bottom surface (713) of the dielectric sheet.

4. The antenna system according to any preceding claim, wherein the feeding structure (41) of each sinuous slot antenna (712;81) includes an end portion designed for 90° Radio Frequency transition;

and wherein each feeding turret (735) includes a connection portion, which is designed for 90° Radio Frequency transition and which is coupled with the end portion of the feeding structure (41) of the corresponding sinuous slot antenna (712;81).

5. The antenna system according to any preceding claim, wherein each sinuous slot antenna (712) includes a respective sinuous slot structure (30); and wherein the sinuous slot structures (30) of different sinuous slot antennas (712) are not connected.

6. The antenna system according to any claim 1-4, wherein each sinuous slot antenna (81) includes a respective sinuous slot structure (82);

wherein the triangular array lattice comprises two or more rows of sinuous slot antennas (81);

and wherein the sinuous slot structures (82) of the sinuous slot antennas (81) in one and the same row are connected.

7. The antenna system of claim 6, wherein the sinuous slot structure (82) of each sinuous slot antenna (81) includes two sinuous slots;

and wherein the sinuous slot structure (82) of each sinuous slot antenna (81) adjacent to two sinuous slot antennas (81) in one and the same row has:

- the outermost cell of one of its two sinuous slots connected to the outermost cell of a sinuous slot of one of

the two adjacent sinuous slot antennas (81); and

• the outermost cell of the other of its two sinuous slots connected to the outermost cell of a sinuous slot of the other of the two adjacent sinuous slot antennas (81).

8. The antenna system according to any preceding claim, wherein the flat antenna array (71;80) is a planar or conformal antenna array.

9. A modular antenna system comprising several antenna systems (70) as claimed in any preceding claim; wherein the antenna systems (70) are placed side by side thereby forming a modular antenna structure.

10. The modular antenna system of claim 9, wherein the side profile of each antenna system (70) is sinusoidal.

11. A phased array system for Electronic Counter Measures, comprising the antenna system (70) claimed in any claim 1-8 or the modular antenna system claimed in claim 9 or 10.

12. An Electronic Counter Measure system comprising the antenna system (70) claimed in any claim 1-8 or the modular antenna system claimed in claim 9 or 10.