CLAIMS:

1. A sensor unit comprising: at least one crystal structure comprising an ensemble of color centers, at least one optical detector, and an optical collector positioned between said at least one crystal structure and said at least one optical detector for directing optical emission from said at least one crystal structure to said at least one optical detector;

wherein said at least one crystal structure has geometrical shape of a trapezoid prism having one of a first and second parallel facets directed toward the optical collector; and

wherein said optical collector is formed as a planar waveguide having first trapezoid section interfacing said at least one crystal and a second rectangular section for transmitting collected light toward the at least one optical detector.

2. The sensor unit of claim 1, wherein said at least one crystal structure is facing said optical collector along a large one of said first and second parallel facets.

3. The sensor unit of claim 1 or 2, wherein said crystal structure comprises reflective coating on at least one face.

4. The sensor unit of claim 3, wherein said crystal structure comprises reflective coating on two or more faces thereof, and wherein at least facet directed at the optical collector or the optical detector are not coated by reflective coating to allow emitted light transmission toward said optical collector and to allow input excitation light impinging onto said crystal structure.

5. The sensor unit of any one of claims 1 to 4, wherein said at least one crystal is a diamond crystal.

6. The sensor unit of any one of claims 1 to 5, wherein said ensemble of color centers comprise one or more Nitrogen Vacancy centers.

7. The sensor unit of any one of claims 1 to 6, wherein said ensemble of color centers is an ensemble of Nitrogen Vacancy centers.

8. The sensor unit of any one of claims 1 to 7, wherein said optical collector is formed of a single unit waveguide.

9. The sensor unit of any one of claims 1 to 8, wherein said optical collector is formed of glass having refractive index between 1.4 and 2.2 for wavelengths in a range between 620 and 800 nanometer.

10. The sensor unit of any one of claims 1 to 9, wherein said optical collector is flexible along at least the second rectangular section thereof.

11. The sensor unit of any one of claims 1 to 10, further comprising at least one microwave resonator positioned for applying selected magnetic field onto said at least one crystal structure.

12. The sensor unit of any one of claims 1 to 11, further comprising at least one laser unit and an optical arrangement adapted to provide selective optical excitation of said at least one crystal structure.

13. The sensor unit of any one of claims 1 to 12, further comprising a magnetic field generator adapted to provide static magnetic field onto said at least one crystal structure.

14. The sensor unit of claim 13, wherein said magnetic field generator is adapted to selectively vary magnitude of said static magnetic field.

15. A sensor array system comprising an array of sensor units comprising at least one sensor unit configured according to any one of claims 1 to 14.