Table 1. Resonant Freq. and Gain relation with r/h ratio

Radius (mm)	Height (mm)	Sea water(ϵ=81)		Mercury (ϵ=1.00074)	
		Theoretical (GHz)	Simulated (GHz)	Theoretical (GHz)	Simulated (GHz)
25	20	9.7	10.84	10.76	11.16
25	30	7.52	8.85	8.74	7.24
25	40	7.07	8.75	7.97	7.14
30	20	10.24	11.29	10.5	11.02
30	30	5.97	4.88	6.83	5.2
30	40	4.9	4.66	5.53	4.54

Table 2. Sea water and mercury results

(r) Radius of Antenna(mm)	(h) Height(mm)	(f) Resonant frequency (GHz)	(G) Gain(dBi)
25	30	8.9	5
25	40	8.75	7
25	50	8.65	8
27	30	25.5	10
27	40	21.2	11

IV. CONCLUSION

Due to stealth property fluid being plasma, it conducts only in excited state, hence most suitable for Military applications. This antenna has advantage of corrosion resistant, frequency agility and better coupling of electromagnetic signal. It can also be used for biomedical applications like a fluid bracelet to monitor health parameters.

As a future work, with integration of microcontroller based MHD fluid pump, height and shape of the fluid, can be regulated. This will provide reconfigurability agility. More work towards micro-fluidic frequency reconfiguration, fluidic tuning of matching networks for bandwidth enhancement need to be explored. We have solved this problem for saline water and mercury. It can be tried out for other plasma materials like ionized gases and Gel based fluids.

REFERENCES

[1] Rajveer S Yaduvanshi and Harish Parthasarathy, "Design, Development and Simulations of MHD Equations with its proto type implementations"(IJACSA) International Journal of Advanced Computer Science and Applications,Vol. 1, No. 4, October 2010.

[2] Rajveer S Yaduvanshi and Harish Parthasarathy, "EM Wave transport 2D and 3D investigations" (IJACSA) International Journal of Advanced Computer Science and Applications,Vol. 1, No. 6, December 2010.

[3] Rajveer S Yaduvanshi and Harish Parthasarathy, "Exact solution of 3D Magnetohydrodynamic system with nonlinearity analysis" Jan 2011, IJATIT.

[4] EM Lifshitz and LD Landau, "Theory of Elasticity, 3rd edition Elsevier.

[5] EM Lifshitz and LD Landau," Classical theory of fields , 4th edition Elsevier.

[6] Bahadir, A.R. and T. Abbasov (2005), "A numerical investigation of the liquid flow velocity over an infinity plate which is taking place in a magnetic field" International journal of applied electromagnetic and mechanics 21, 1-10.

[7] EM Lifshitz and LD Landau, "Electrodynamics of continuous media" Butterworth-Heinemann.

[8] EM Lifshitz and LD Landau," Fluid Mechanics" Vol. 6 Butterworth-Heinemann.

[9] EM Lifshitz and LD Landau," Theory of Fields" Vol. 2 Butterworth-Heinemann.

[10] JD Jackson, "Classical Electrodynamics" third volume, Wiley.

[11] CA Balanis," Antenna Theory, Wiley

[12] Gregory H. Huff, Member, IEEE, David L. Rolando, Student Member, IEEE, Phillip Walters ,Student Member, IEEE and Jacob McDonald, "A Frequency Reconfigurable Dielectric Resonator Antenna using Colloidal Dispersions "IEEE ANTENNASAND WIRELESS PROPAGATION LETTERS, VOL. 9, 2010.

[13] Fayad H and Record P, Wideband salt water Antenna IEEE conf on wide band and multi band antenna and arrays, Sep 2005

[14] Buncher R ,Hepter GT and May MP , Dielectric relaxation of acquous NaCl solutions J Phy, Chem a 1999 103 PP1-9.