UNCLASSIFIED
UK SECRET
UK EYES ONLY

Volume 3 - Chapter 1, Page 3, Paragraph 11

S.26

8. The reflected power measured by a radar system is the average integrated power reflected from a finite illuminated area. If the reflecting area is smooth, with no irregularities, then the reflection will be entirely coherent and specular and a one-dimensional model can be adequate. However, if there are large spatial irregularities then the signal will be completely incoherent and diffuse. In between these extremes the reflected signal will contain both coherent and incoherent components, depending on the physical structure of the irregularities. In the context of the `multi-cored' UAPs this seems likely to be the case. In the near field, from these diverse reflectors, there will be interference patterns and, potentially, considerable variability of reflected signal strength. The far-field value will be the residual signal resulting from the incoherent combinations.(R)

9. Since the plasma (or `linked-plasmas' in a multi-core type UAP) will be, (according to witness reports of motion and colour change in the lights), in almost constant motion, it is reasonable to suggest that either regular or irregular field modulations could be present - not only in the self-radiation of the body, but in its radar-reflective properties. In basic terms, its RCS is likely to be fluctuating, probably for most of the time. This may not be the case where single-coloured ball lighting is reported which seems to be more stable than the multiple colour, multiple `core' system that frequently form `triangular', `rectangular' or `stacked' assemblies, often with an apparent shaped black coloured void between the bounding `hot spots'. It may well be the case that quite apart from variable scatter from a large proportion of the total apparent reflecting area, that the variation of the reflectivity of the core itself may be below a particular radar's minimum detection capability.(R)

10. The scattering of EM waves from a variable surface has been long studied for more conventional radar targets. For a fluctuating plasma a number of variations will be evident dependent, for example, on the RMS coherent scattering coefficient, the RF in use, the ripple and curvature on the plasma surface, the electron density, correlation length, etc. Refraction effects, additionally, could cause smearing of the beam profile and absorption further weaken the radar returns, even if the electron density is theoretically adequate for the incident RF to be reflected under ideal conditions.(U)

11. In summary there are several viable reasons why there are a number of UAP reports daily, probably of plasma-type entities, S.26

12. **Plasma Cylinders & Vortex Rings** Occasionally UAP reports describe a circular, cylindrical or `boomerang' shape. These are sometimes oriented horizontally and sometimes vertically and various models are proposed. Entities are sometimes described as "a row of balls touching each other" or "a stack of discs one above the other"; the radius differs at various points along the `cylinder' length. In some ways the resultant RCS can be expected to

UNCLASSIFIED
UK EYES ONLY
UK SECRET