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Unidentified Aerial Phenomena in the UK Air Defence Region: Volume 1

Main Report

SCIENTIFIC & TECHNICAL MEMORANDUM - No. 55/2/00

DEFENCE INTELLIGENCE STAFF

December 2000 Defence Intelligence Analysis Staff

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AN EXAMPLE UAP FORMATION OF THE TRIANGULAR TYPE

PREFACE

"What does all this stuff about flying saucers amount to? What can it mean? What is the truth?. Let me have a report at your convenience".

W.S. Churchill, 28th July 1952

The material researched is reported in three Volumes. Volumes 1 and 2 are classified RESTRICTED. Volume 3, SECRET, [redacted] contains current radar performance data. [redacted] S.26

A new database, comprising separate, but linked, data-tables, covers as many as possible of the specific UAP descriptors which regularly appear in the sighting reports. A unique common identifier for each sighting enables, for example, the sounds, shapes, lights, locations, colours, velocities and many other attributes which are reported, to be cross-related; including those of possibly the same object, from multiple witnesses, and for the probable credibility (or otherwise) of a witness. The database is briefly described in the Main Text of Volume 1, and in some detail in the Annexes; which also contain the results of the first analysis. Volume 2 comprises a series of short working papers which identify the key features of the many natural phenomena and man-made phenomena which impact on human observations of objects seen both within and above the atmosphere. This has been essential in order to identify the keywords and to build on the filtering process; and to recognise, through a scientific approach, any natural, though often abnormal, phenomena.(R)

The aim throughout has been to make a rational scientific examination of the phenomena - based only on the raw material - UKADR incident reports. Every effort has been made to take a wide systems approach, to avoid over-focusing on single events. There has been neither the intention of de-bunking the extra-terrestrial lobby or of taking the opposite view - **except based on hard scientific evidence.** Where illustrative material has been used its copyright has been acknowledged whenever this is known.(R)

Comments on this document, which has been prepared by [redacted] are welcomed and should be addressed to MoD, DIST, DI55 [redacted] Old War Office Building, Whitehall, London SW1A 2EU. Tel. [redacted] (R) S.40 not relevant

February 2000

Issued by [redacted] DI 55

UNIDENTIFIED AERIAL PHENOMENA IN THE UK AIR DEFENCE REGION

VOLUME 1 – MAIN REPORT

CONTENTS

VOLUME 2 - WORKING PAPERS ON ASSOCIATED NATURAL AND MAN MADE PHENOMENA

WORKING PAPER INDEX

VOLUME 3 - MISCELLANEOUS RELATED STUDIES

"There seems to be a campaign building up to criticise government policy about the release of information on unidentified flying objects. The authors of the campaign are firmly convinced that extra terrestrial manifestations have appeared, whereas the Air Staff are by no means certain. As it is not possible to release official data which does not exist it is difficult enough to satisfy those with preconceived ideas to the contrary". Memo 19, August 1958

CHAPTER 1

HISTORICAL STUDY BACKGROUND & AIM

INTRODUCTION

1. **Historical** Objects in the atmosphere, sometimes on the ground, but often much higher in visible space, have been reported for millennia. Reports from within UK airspace alone, number thousands since the 1950s, as shown at Figure 1.1. Clearly these reports are of something not being understood at the time by the observer. Since manned flight commenced and with the advent of outdoor laser displays, space flight, unmanned aircraft and greater public awareness, caused largely by media hype, the phenomenon of "unidentified flying objects" (UFOs) has reached heights of unprecedented public interest. In the past this has undoubtedly distorted the clarity of approach needed for a scientifically-based analysis. It has been recent MOD practice to refer to such phenomena, in the absence of rational explanation, as Unexplained Aerial Phenomena (UAP). Further, from the record, it is clear that it was MOD policy from the outset that any interest in UAP is only necessary as an assurance that any such object is not a threat to UK airspace or assets. In August 1950 a Working Party was set up (at the suggestion of Sir Henry Tizard) who thought "flying saucers should be investigated". Records show that the 11th meeting of the Joint Technical Intelligence Committee (Ref. DSI/JTIC(51) Item 8 (1951)) received the Chairman's Report of the "Flying Saucer Working Party". The Committee decided that "the document should be regarded as the final report and, in view of the conclusions the Working Party should be dissolved". The Chairman (Mr. G.L. Turney DSI3) went on to say that, "following the lead given by the Americans on this subject, the Report should have as little publicity as possible and outside circulation should be confined to one copy, for Sir Henry Tizard". The Report was approved. The Department does not possess a copy of this report (it may exist within Sir H. Tizard's papers), but it is implied that nothing important was found. Great Britain was happy to allow the US studies to answer any outstanding questions. However, there must have been further concern and the Prime Minister's request, quoted at the Preface, came the following year and the brief subsequent reply, produced a few days later, is shown here at the Historical Annex.(U)

2. The United States Air Force had started to take an official interest in 1948 (PROJECT SIGN), later changed to PROJECT GRUDGE and then to PROJECT BLUE BOOK. Such was the concern in the US that by 1952 ××××× instigated a covert study group to investigate the "10% of incredible reports from credible witnesses". In fact, over 10,000 reports, spanning 19 years, were processed by 1965 (of which it was reported that about 7% were unexplained). It was also questioned whether any use could be made of the phenomena for psychological warfare. The covertness of this investigation subsequently contributed greatly to charges of a government 'cover-up' - a notion that has continued to this day. In 1952-3 the US had set up the Robertson Panel (Intelligence Scientific Advisory Panel) and observed that British experts (Prof R.V. Jones and others) were taking the increase in UAP sightings seriously. Meanwhile, it is noted, the S.27

possibility of the USSR using a UFO scare as a means of jamming communication channels, while simultaneously attacking the West was considered a serious possibility - even though the investigation team had dismissed sightings of 'UFOs' as 'explainable'! In 1953 the USAF commenced a more detailed collection of sighting information which, according to US Government statements, ceased in 1958 with no proof of extra-terrestrial origin. However, the topic would not go away and by 1966 the USA's CONDON Report had studied and reported on 59 events in detail. The report concluded "While we do not think, at present, anything worthwhile is likely to come out of research (i.e. into UFOs), each individual case should be considered on its merits. No (separate) US Agency is required - but this may not be the case for all time". Great Britain took no part in this USAF study, and there is no record of the Air Ministry requesting or receiving this report within the Department. Other nations are also known to have shown a continuing interest in this topic, especially in China, the Czech Republic, the USSR and, subsequently, the CIS and Brazil, South Africa and Spain - who, in 1997, released 66 'UFO' files to the public. However, **no** reports have been received from any of these nations by UK intelligence staff; any information being casually noted through open sources and publications as a matter of passing interest. Unfortunately, public interest and suspicion in the UK has also remained undiminished, resulting in a 'UFO' demonstration outside MoD in March 1995, a spate of public letters and frequent Parliamentary Questions and even debates on the topic. The Department is not tasked to collect or examine anything other than reports sent on by Air Sec (2a). Until this reporting procedure was reduced in 1997 there was an increase in reports and hence in the departmental effort required. This is the first UK detailed and authoritative report which has been produced since the 1950s.(R)

3. **UAP Reporting Procedure** In the 1950s, the then Air Ministry, produced a 'minimum format', one page, 'UFO' reporting procedure for both public and military reporting of the phenomena. This procedure has remained unchanged and all event analysis in this report is based on an analysis of a voluminous paper database, which spans about 25 years. Further, it is not within the remit of the department to pursue witnesses to elicit any further information beyond that which they have provided to the MOD on the standard form. This information source has many inadequacies - and much of the initial work concentrated on the conversion of this material into computer database format. Only data which has originated within the airspace (comprising the UK Air Defence Ground and Air Environment, the UK Air Defence Region) is used in the database analysis, although the support of authoritative scientific reference sources world-wide has been made to come to a considered decision as to the most likely causes of the phenomenon.(U)

4. Access to individual official UAP sightings from other nations has not been possible. The MOD has no contact with other nations to supply such material and similarly, does not make UK sighting reports available to other nations - indeed, no such requests have been received.(U)

5. On receipt of reports from the general public, military, or other sources (e.g. police, coastguards, aircrew etc.), one report format is completed for each separate sighting and sent to MOD, usually via the police, military establishments or air traffic control centres. These are passed to MOD Sec (AS2a) and have been routinely copied to DI55 for brief scientific perusal. Reports older than 30 years are available to the public through the Public Record Office.(U)

6. **Air Threats** The Ministry of Defence, charged with the Air Defence of the Realm, are only interested in UAP reports if they are found to reveal a threat or a hazard. For the purposes of the study it has been assumed that a threat would **only be identified as such,** if:

- Controlled, unidentified, air-objects could successfully penetrate the defended airspace of UKADGE with hostile intent in PEACE, CRISIS or WAR.

- Damage (or potential damage or danger) could be caused in the form of physical effects or electronic effects, or if there is a possibility of an air hazard, such as a collision or damaging incident with civil or military air traffic.

- Objects within the airspace were found to be hostile if challenged and invulnerable to radar tracking and could out-manoeuvre our airborne or ground-based air defences.

- Controlled objects could enter and leave the UKADR, having possibly obtained intelligence data (e.g. Imagery, ELINT etc.).

(R)

AIM OF STUDY

7. The Terms of Reference of DI55's remit and for this investigation are at Annex A. In order to meet the aim, which is **to determine the potential value, if any, of UAP sighting reports to defence intelligence**, it has been considered necessary to pursue at least the following tasks:

(a) Assess whether the UKADR airspace has been breached by any potentially hostile flying object.

(b) Determine, if applicable, what intelligence, if any, is revealed on military capabilities of other countries.

(c) Ascertain whether any scientific and technical information of military significance is contained in the sighting reports.

(R)

8. This is interpreted, for the purpose of this Study, as:

- Determine, from the available UAP incident reports (example at Annex B), whether any scientific facts can be elicited from these phenomena - which may indicate military purposes.

- Use database technology to separate the useful from spurious information, thus providing a basis for any future analysis that may be tasked.

- Identify atmospheric and other conditions under which these sightings can occur thus enabling, if possible, their causes to be established and whether they can be disregarded or even predicted.

- Monitor reports (from any source) in case the underlying physical phenomena is already being exploited by another nation for potential future military purposes.

- Try to discover why some of the UAP events, seen by human witnesses, are apparently sometimes visible and sometimes invisible to the UKADGE and airborne radar reporting systems.

- Investigate whether any UAP report can be correlated with any 'no survivor' air accident.

In order to meet the aim of the study a detailed understanding of all reliable information is essential and it was likely that, in the search for any information of interest to defence intelligence, other related information of interest to the air defence community might be revealed. (R)

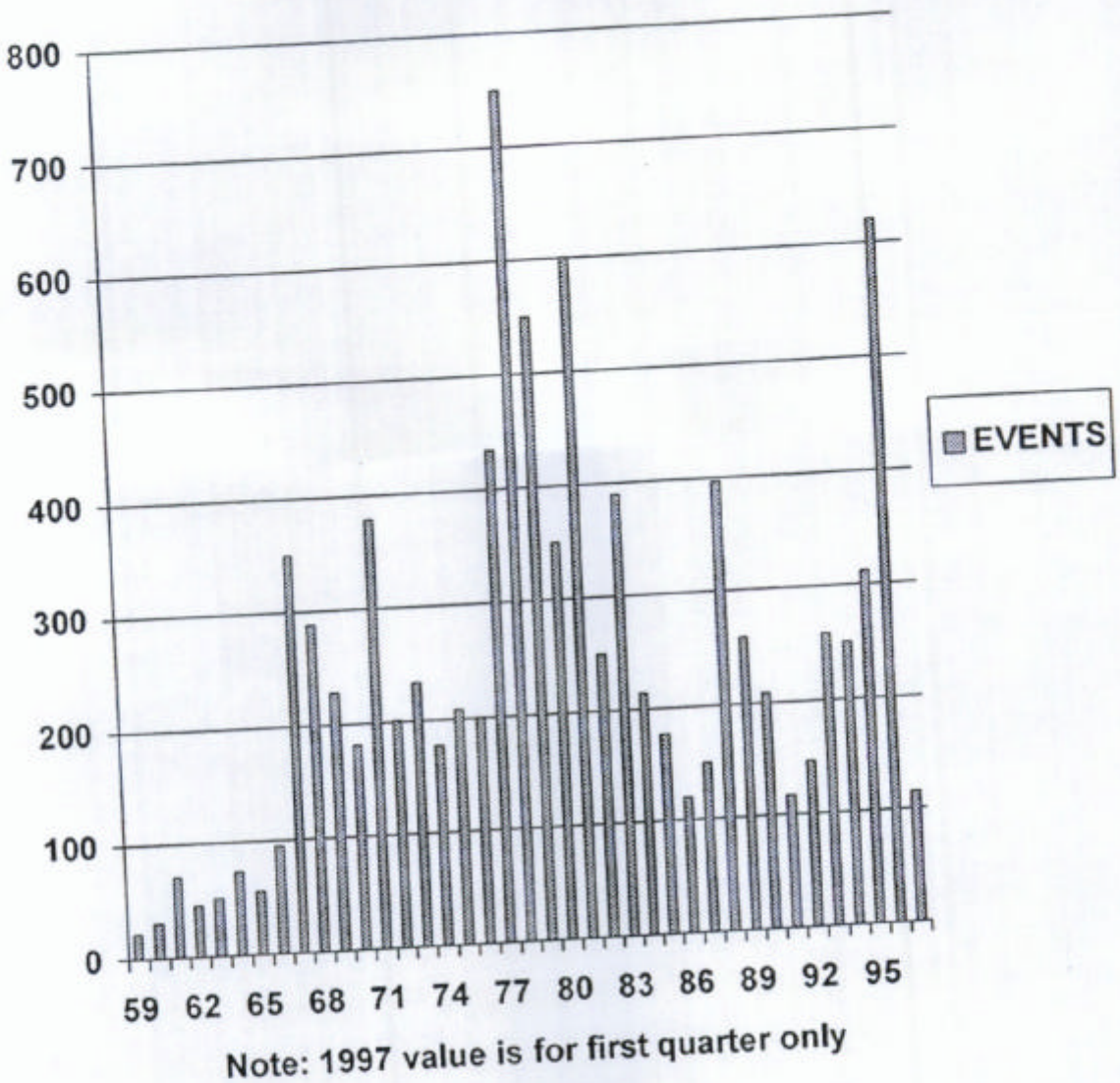

FIGURE 1-1 NUMBERS OF UAP REPORTED ANNUALLY 1959-1996(U)

CHAPTER 2

ANALYSIS METHODOLOGY

RELEVANT INFORMATION

1. In order to manipulate the available data and efficiently filter the known from the unknown (or incomplete) it was first necessary to identify key words and all known natural and man-made phenomena surrounding the topic. In so-doing the scope had, on the one hand, been carefully limited; but, on the other, it was essential to strive to capture as many **describable** attributes as possible to build an electronic database, so as to avoid the need for database re-design later on; should further investigations be found necessary. It was found that a considerable amount of relevant background information was obtained. While the tedious task of converting thousands of paper UAP reports into electronic form proceeded each of the key associated topics was researched and produced in the form of separate Point Papers which could be used as reference material during the subsequent manual and statistical analysis. An understanding of as many apparently associated familiar and unfamiliar aerial phenomena was considered to be an essential part of the methodology of analysis for the study. These are contained at Volume 2, which contains 25 Point Papers. For convenience here they are grouped into 7 main topic areas:

- **Man-made Air Vehicles** These are often mistakenly reported as UAP and those of appropriate shape or rarity to be reported as UAP are covered at Working Papers Nos 9, 14, 15 & 17.

- **Meteorological & Atmospheric Phenomena** These important factors are covered at Working Papers Nos 2, 13, 18, 19, 20, 23 & 24 and are fundamental to understanding the UAP events One of the more important findings is that of a 'total absorption' optical phenomena, which can exist in the space between charged buoyant bodies, giving the appearance of an airborne shape (for example, a 'shape' which is a visual triangular void, between 3 such charged bodies and from which no light is reflected). The findings on buoyant plasmas are of particular significance.

- **Reported Effects on Humans** Papers 1, 4 & 25. In the course of research (and on the assumption that some sort of field in addition to the (visible) electromagnetic emissions may emanate from a UAP), a brief investigation was made into medical effects of fields upon humans. The search for relevant information went beyond UK sources and an important and very relevant phenomena was reported in a Canadian medical journal which indicated that **certain magnetic field structures caused the human brain to respond in a very similar manner to that exhibited by 'close-encounter' UAP witnesses.** This is explained at Paper 25. The presence of a 'field' near UAP, which affects humans, has been reported in Russia.

- **Celestial, Ionospheric & Terrestrial Phenomena** These aspects are reported at Papers 10, 12 & 16.

- **Sighted Shapes, Motions & Sounds** A compendium of typical UAP shapes is shown at Paper No 11. Motion and Sound are at Papers Nos 7 & 8, and at No 18.

- **Detection by Radar** This important topic is considered in general radar terms at Point Paper No 5 and specifically in the context of the current UKADR radars at Volume 3

- **Exotic Technologies** Paper No 6 (R)

2. At the start of an understanding of UAPs, simple man-made airborne objects such as aircraft, para-wings or balloons are often the explanation. The range of options then progresses through a set of other relatively easily explainable man-made, atmospheric and natural and unusual, propagation and atmospheric phenomena (some of which are still not fully understood). In addition there are hoaxes. The final level is that of the extreme possibility of extra-terrestrial objects under some sort of control. There is always the possibility that some, relatively rarely, reported events have a supernatural basis or are due to a mental condition of a witness. Nevertheless, a variety of key factors can be used to filter the explainable from the inexplicable. In the past often the latter conclusion was reached, due to a lack of information, which was probably available at the time, but not noted on the sighting form. Unfortunately, even if a follow up had been possible, by the time event reports are received the 'trail has gone cold'. Ideally, some experience and scientific background would be essential **at the time of an event** to elicit the type of information required - the key items which are required to make a rational and credible judgement on the cause of the event. As DI55 are not permitted to make follow-up investigations after UAP events and not even to speak to witnesses to clarify the meaning of, (often cryptic or missing observations), analysis is dependent only on the paper report. (R)

3. Since it seems unlikely that all UAPs are reported (some researchers believe as many as 80-90% are **not** reported for a variety of reasons); the proportion of all types of events including those barely credible, are likely to be greater than received MOD sighting reports indicated at Figure 1-1. Some of the actual values are shown at Table 2-3. Unfortunately the great majority of UK Report Forms are incomplete or incompetently completed or are as vague as the typical example UAP report at Annex B. (R)

4. The spread of related science in attempting to find explanations for every object reported is significant, especially as this is an 'Air phenomenon' and which there are inevitably areas of atmospheric physics, optics, propagation, and atmospheric electrostatics and magnetics in which knowledge is known to be incomplete. Further, the study necessarily includes wider elements of physics, chemistry, aerodynamics, meteorology, psychology of perception, vision, geometry and human mental states. There is, at the beginning of such an investigation, even the possibility that some form of unknown field is an influence in how the unfamiliar object is formed, moves or disperses. A further understanding of some of these areas could well spell the end of the 'UFO' enigma. Sighting reports for the analysis are mainly drawn from the last 10 years, and in particular the last 5 years of a set of reports which are held back to 1968. (Previous reports having been destroyed and other related correspondence released to the PRO under the 30 Year Public Disclosure Rule). Various descriptions have been applied to UAP events by the media. These are ignored for the purposes of this analysis. Clearly a UAP is always something which is seen, apparently capable of 'flight' (in that it is the sky and on occasions it is seen on the surface) but which, although it may be proved otherwise, does not exhibit the expected characteristics familiar when viewing man-made vehicles. A UAP cannot be dismissed by the observer as irrelevant. Many of the public feel it their duty to make reports and they are very concerned that the authorities should be made aware of what they either believe they have seen or apparently seen. Often a report is made on the following day after some thought has been given. This means that a distortion of events can occur due to the time lag. Reports regularly show that witnesses are quite concerned about possible ridicule but they are equally adamant about what was seen.(R)

5. Many of the events are reported by trained observers, often members of the Armed Forces (both by Air and Ground Crews), Police or Coastguards or Civil Airline Pilots. Clearly one or more of the following occurs:

- The key stimulus is visual.

- A physical form is seen, which is then attributed a shape and/or colour, and sometimes a sound and, on rare occasions, even a smell.

- All attributes reported are subject to the witnesses own perception and interpretation.

- A visual picture is often 'seen', which may not necessarily equate with that 'seen' by another observer of the same phenomenon located nearby. This suggests that the 'picture' formed may have been mentally adjusted, possibly due to some other factor present at the time.

- A physical form may be reported as a result of a combination of what is actually seen with a pre-conceived or sub-conscious mental distortion (in the witness's own-cognition of the event).

-The object(s) is considered to be important, extraordinary and even frightening and a reported is made to the authorities because it might be a threat of some kind.

- Reports, exceptionally, may not be made or may be delayed, for fear of ridicule.

(R)

6. UAP Data is always inadequate. For example, within the department, there are no sound recordings to analyse, few still photographs (none close-up), some videotapes (none close-up), and no instrumented measurements. Inspection of (surface to air) photography has not revealed any useful evidence beyond that of explainable aerial objects and only a few memory sketches exist during the last 30 years of reporting. Any supposed UAP 'ground contact', (for which there are no photographs, only rough sketches) has been reported as 'leaving circular marks'. Also, on a few occasions there have been reports of depressions to rural surfaces and bending or other minor damage to hedgerows and at least one report of fire to some railway sleepers. Rarely have reports of animals being affected been received.

(R)

EXOTIC TECHNOLOGIES

7. Any investigation into exotic aerospace technologies goes beyond that of an examination of the UAP sighting reports. The aim of the study has been to thoroughly investigate any facts which might have a bearing on defence intelligence. Any extension of the research to attempt to 'fit' UAP report detail to potential technologies which could cause aerial devices to perform in hitherto exceptional profiles, must necessarily be limited. A strictly scientific line of approach has been taken, hence:

- Any research has been limited, based only on the available evidence and known science, so as to confirm or eliminate the possibility that some sort of aerial object(s) which **may (or may not) be a threat can enter and leave the UKADR, either undetected or detected but remain invulnerable to our current air defences. This has necessitated a brief study of related radar topics.**

- In an open scientific enquiry the likelihood of any unexpected, but nevertheless rationale finding, must be a possibility and no evidence has been disregarded.

- As no definitive scientific explanation (or even the most probable scientific probable explanation) of **has ever been given any UK report since the 1950s,** this study has provided an opportunity to encompass much more evidence that has hitherto been available.

- Initially, it could not be discounted that an extraordinary (even extra-terrestrial) finding **might** account for some events. It was also clear that to arrive at such finding, (given the exceptional attributes which some witnesses attributed to their aerial sightings), that this could only be the result of technologies which encompass scientific and engineering attributes which are well beyond even the far-term aspirations of any aerospace industry on earth. For example, attributes and abilities which allow a vehicle and any occupants to:

  (a) Carry out inter-planetary or possibly inter-galaxy travel.

  (b) Travel in the Earths exo and high endo-atmosphere at hitherto impossibly high velocities compared with all current air vehicles, yet with the capability of 'hovering' and possibly of landing and taking off again.

  (c) Move in the atmosphere with soundless or near-soundless motion, and in an aerodynamic manner which does not cause sonic-booms.

  (d) Possess manoeuvre capability which is significantly beyond our current capability and which certainly appears to be beyond that which it is believed humans might withstand.

  (e) Have a visual form which can be observed either by reflected light or by internally generated light from within and also appear to be opaque at times in contrast to the viewing background.

  (f) Not necessarily be seen always by radar.

  (g) Produce 'lights' which seem to have directionality (allegedly seen as 'portholes' or 'beams').

  (h) Exhibit characteristics, on occasions, which have been described as 'intelligent'.

  (j) Apparently emit some sort of invisible field, which, when in close proximity, can, reportedly cause humans and equipments to respond in unusual ways. At worst a close range exposure to a UAP can cause some disturbing mental and physical effects and cause electronics and electrics to temporarily malfunction.

- Finally, unless some unprecedented intelligence gaps have existed over many years, the possibility that the study finding would show that the presence of the unexplained proportion of UAP sightings is due entirely to man-made phenomenon, while not totally impossible, was clearly very unlikely. (R)

8. To attain the exceptional aerial performance, based on the reports studied, a UAP vehicle reportedly (but not always) often exhibits both propulsion and aerodynamic characteristics at or beyond the limit of current human design and engineering capability; leading to the certainty that, as a designed vehicle it would have to utilise, as a minimum, the following technologies:

(a) Some type of **propellant field or thrust reaction** which can provide air-vehicle performance far beyond conventional rocket or turbine technology. Examples might be:

- The use of anti-matter reactive-propulsion (see Working Paper No. 6).

- An inertia-less body, which does not disturb the atmosphere acoustically.

- The use of terrestrial and space fields not totally understood: e.g. gravity fields, magnetic fields, electrostatic fields, torsion fields (or a combination of these) or even field types not yet discovered on earth.

Einstein and others believed these latter fields existed. (see Working Paper No. 6).

(b) **Materials and Structures** The properties of which appear to be exceptional. Velocities are reported which would require materials and construction which is beyond any known technology. In addition, they would require special cooling, shaping, layering/sandwiching which we do not currently possess (even if we had the capabilities to accelerate/propel/sustain at what appear to be phenomenal velocities).

(c) An understanding of **surface-plasmas**, charges etc. which allows aerodynamic vehicle drag to be minimised to an unprecedented level and which would also affect their radar echoing area..

(d) An advanced understanding of at least the following technologies either beyond the level understood on earth, or capable of developments and exotic applications of:

- Superconductivity
- Transmitted Power
- Gyroscopic-related phenomena
- Sensors
- Thermo-dynamics
- New information/communication channel.
- Other technologies not yet known.

(e) Be based on a sufficiently advanced understanding of earth science to be able to visit earth's atmosphere, enter and fly about and leave, either as individual vehicles; or, as reported, by merging into a larger 'mother' craft. A mother craft which, presumably, would also have to have at least the same attributes as (a) to (d) inclusive. If a UAP was assumed to be an advanced 'craft', inplying intelligent control, then it might, conceptually, either be 'manned or unmanned'. Reports suggest (and note should be taken of the findings at Volume 2 Paper 25) that 'beings' are rarely reported as wearing special clothing or even helmets. At the very least a 'manned' craft would imply survivability during repeated exceptional accelerations, decelerations and manoeuvres. (R)

9. While there is no firm evidence that there is life of some form elsewhere in the universe - this does not mean that there is none - it may either be beyond our current sensor capability or may not be life as we know it. Other than the rare descriptions of 'beings' in or near UAP, which only occasionally occurs when a really close-up UAP event occurs, reports do not indicate that intelligent control is present. In fact, when near to the ground, (generally below ~5000ft) a UAP is often reported to make indecisive darting and bobbing motions. (U)

10. As this study proceeded certain data emerged which correlated unexplained aerial object phenomena with natural phenomena. Defence intelligence interests will not furthered by continued investigations which focus on potential extra-terrestrial sources. (R)

UAP SIGHTING REPORTS

11. The raw material supporting UAP events is only in the form of paper reports, with very few UK photographs or video records. Analysis is therefore based on:

- **Documented Data** This is sometimes supported by photos, sketches, video, recordings, rare radar sightings which are always short-lived.

- **Corroborated Data** An examination of a series of reports apparently describing the same phenomenon from either the same witness reporting at time intervals or several witnesses in the locality.

- **Timely Sightings** Sightings to which reaction has been made. For example, rare events after which some form of Air Traffic Control follow-up has occurred, other sources questioned, etc. Liaison between radar sites is rare, especially because detections are rare and of short duration. (R)

12. It is considered that every scrap of information is essential, however irrelevant these may seem to the layman. Hence, the information analysed on the database is based only on pre-April 1997 reports, working backwards in time. Only reports deemed to be from 'credible witnesses' have been forwarded to DI55 since that date. As these are in isolation they cannot be corroborated or correlated as regards time, form or motion. By and large, reports originate from someone who has seen an unfamiliar object or phenomenon, or a familiar object in an unfamiliar situation. If numerical data is involved it is usually the case that reports are imprecise, of limited accuracy, often inadequately completed and by untrained observers. Angles and directions are approximate. Late reports are undoubtedly embellished after the events and self delusion, falsification of facts or even deliberate hoaxes have been known. Stories grow in the re-telling, particularly in the popular media. Nevetherless, MOD has continued to treat the subject seriously. Despite the fact that the paucity of UK data compares unfavourably with the quality of witness reports which US scientists have examined - each US (openly published) report being nine pages long - the US Government do not appear to have resulted in any authoritative conclusions. Pressed for a comment, rather than a proper investigation in 1967, an internal UK intelligence reply on file, since released to the public, stated that UFO reports (as they were then known), following "an examination of the evidence" had resulted in the conclusion that the 'unknown' sightings pointed to

- Activity under extra-terrestrial control, or:

- Clandestine activity, or:

- Activity for which scientific explanations have yet to be found. (R)

13. Unfortunately, to this day, there remains a persistent lack of scenarios where solid scientific measurement can be made either at or directly after an event. What is required to identify causes beyond doubt is evidence in the form of artefacts, field or radiation measurements, physical disturbance of terrain and close-up UAP imagery; especially multi-aspect imagery.(R)

14. While not necessarily possible during the time-scale it was realised that algorithms could probably be derived to automate the analysis so as to rapidly identify the clearly known from the unknown. Resources were not available for automation, neither was this considered necessary - unless later analysis showed this to be essential.(U)

UAP CLASSIFICATION

15. While it is not the intention to use information produced by the host of 'Ufologists', who regularly correspond with Sec AS, often requesting information, note is taken of a system of classification of types of alleged UAP incidents developed by researchers and used widely in The West. Apart from UAP sightings at longer ranges, UAP watchers have, naturally, been especially interested in those where humans have been relatively close to aerial objects as these have often produced the most bizarre of reports and human responses. These are (in popular media terms) known as 'close encounters' (CEs), which have been classified into 5 distinct 'kinds':

- CE1 Observation of an unknown object within a range of 500 feet.
- CE2 Trace evidence, e.g. on radar, or of a 'landing'.
- CE3 Observation of a 'creature'.
- CE4 Abduction.
- CE5 Responses from UAP to human stimuli (e.g. signal lights). (U)

16. No comment is made on CE3 or CE4 in this report, other than it is clear that some reports, from different parts of the world, seem to have similarities beyond the normal expectation of coincidence. An open mind was kept on these two topics, until the research summarised at Working Paper No 25 was uncovered and examined alongside typical UAP reports where CE3 and CE4 effects had been reported . Even for CE1 and CE2 there is the classic logic dilemma - 'if we don't know what these things are, how can we determine if they are a threat'? The UK reports, held in DI55, include a few where adverse physical effects were experienced by UK witnesses and where vehicle equipments have reportedly malfunctioned.(U)

LIGHTS AND SHAPES

17. In order to embrace all reported UAP shapes into the new database a very brief survey of some of the UAP imagery which is in the public domain from both within and outside the UKADR was made. The locations of the most frequent numbers of UAP sightings are shown on the World Map at Working Paper No. 3. It was important to be aware of non-UK reports, if only to recognise shape and colour similarities and keywords to be used in the database. For example, the selected Czech Republic list at Annex C goes back to the year 1607. It is noted that in these Czech examples:

- Descriptions are much the same and often identical to those reported today.
- Listings go back far beyond the days of all manned flight, lasers or satellites. Hence, none of these familiar objects of the 20th century could have caused the earlier reports shown.

(U)

18. Today, it is often claimed that some 25% of reports fall into the simple categories of ball lightning and optical distortions of the sun and moon. The majority of the others are clearly due to the

whole range of possibilities covered in the diverse working papers at Volume 2. Because 'lights' in the sky play such an important part in the sighting reports it is necessary to consider the precise meaning of what is seen in visual terms, this has a significant bearing on the interpretation placed on what is seen. First, the term 'lights in the sky' does not (unless it is a manned aircraft) mean 'lamps' in the normal sense of the word. A bright object is the most normal anomaly which first attracts the attention of a witness. Thereafter, it is mainly described as 'a light'. In practice, while this often distinguishes the object from the fact that 'a clear shape' cannot be seen, the object is often fuzzy or lacks focus or concentration and usually leads on to the statement that the object 'is round'. In fact a bright light may be obscuring the fact that the object is a completely different shape altogether. (U)

19. It is inevitable, therefore, that the great majority of statistical information will be based on reports that were first seen as 'round lights'. Further a circle of separate lights may be described as 'round', whether they are very close together or further apart - even when there is no apparent solid object in the centre of the ring. Similarly, three or four lights may be perceived, respectively, as a'triangle' or 'rectangle', when there is no actual triangular or rectangular object present. [Due to physical phenomena it can be shown that there are conditions where, because of zero ambient light reflection, the intervening space between lights can appear to be filled with a solid shape.] A 'flashing light' does not necessarily mean a regular flash-rate or even that the flashing continued without a break. Often an object is described as 'glowing' when, in fact, it is very dimly lit but not a clear-cut shape. Sometimes 'a light', referring to the main object is said to project 'a beam'. In plasma terms this is a visible manifestation of charge-energy finding a discharge (i.e. leakage path). It is seen, therefore, that even the basic information obtained from almost every UAP sighting is a veritable minefield of inadequate data that can easily lead to misinterpretation when part of a statistical analysis. Further information is at Chapter 3. (U)

20. **Manual Interpretation of UAP Reports.** Sensing the presence of a UAP is almost always firstly visual, involving lights and shapes. Most of the known and unknown identifications can be shown and manually interpreted, in the first instance, in tabular form Tables 2 and 3, compiled as a result of initial investigations are intended as an adjunct to assist in the later interpretation of information gained from database analyses. However, there are many more attributes that must be included in the database tables, where known. It is assumed most hoax incidents will be perpetrated to represent the widely expected 'saucer-shape' spoof imagery/photograph or description. A compendium of imagery has been compiled at Volume 2 (Working Paper 18) as an aid to the identifying the most common shape categories, of which 'saucer shape' is only one. In fact the misnomer only came about because an early US pilot sighting described what he saw as 'like saucers skipping or bouncing across a pond'. It will be seen that a great number of events reported within the UKADR are of triangles, cigars and rectangles. (U)

21. For manual interpretation of a sighting Table 2-1 provides a frame of reference. This is the 'key' table but it is not intended to be a single reference table which can identify every sighting - rather a guide to the type of likely identification which must be backed up by further investigation using every scrap of evidence available. Unfortunately, it is the case that vital information - which could probably have been elicited from a witness by careful questioning cannot be included in many analyses. The Table is based on all known shape and colour attributes, as these are the most likely two keys which a witness reports. (U)

22. Having obtained a colour from an incident report and hopefully a reliable shape, a linkage made to other data to obtain the most likely identifiable cause. At this point other salient information (e.g. day or night, time, size, geometry, meteorology, motion and sound) can be checked and incorporated into

the decision. However, it is essential to cross-check against Table 2-2 before making a final decision 'explainable' or 'not explainable' (through lack of data), or 'inexplicable' (having considered significant data).(U)

23. Table 2-3 contains data usually attributed to those UAP events which have been impossible to categorise with certainty. While the format at Table 2-1 allows the cause to be identified, Table 2-2 (part 2) cannot identify the cause because these shapes, together with their reported colours cannot be attributed to definite air-objects. For example, if the desired shape with colour cannot be co-ordinated at Table 2-1 (e.g. there is no 'PINK DISC') then the attributes should be checked against Table 2-2 There, it is seen that silent, zero-to-fast-moving, silent pink discs are listed as unidentified objects. **Green discs**, it is noted, are not present on either table - since these have not been reported. However, green balls/spheres are often reported. (U)

24. There are several aspects of reporting where witness data, even from 'credible witnesses' may not be accurate. This must be considered when making judgements. For example:

- A sphere may be described in error as a disc or vice versa.

- A disc viewed other than in plan may often be described as a cigar, especially if it is viewed in silhouette and seen partly shadowed.

- A disc may be described as a cigar or a sphere or oval, depending on the aspect. Coloured lights, in a row from one aspect, may be described as a triangle, rectangle, diamond, or even a pentagon, when viewed in plan. For example, as all orientations are possible, the same diamond-shaped pattern of light centres, seen in plan by one observer can be described as a 'stack of coloured balls' by another; when it is vertically buoyant; while yet another, after it has rotated, sees it as a 'row of lights'.

- An aircraft may be described as a triangle (since some deltas are still flying) or as an aircraft because 3 lights are seen in a triangle (i.e. wing tips and tail).

- A helicopter may be described as a disc if an illuminated rotor path is seen, (usually this type of report can be separated by the distinctive noise, if reported).

(U)

25. **Further Identification** Likelihood is a strong factor in elimination of known from sightings which initially appear to be inexplicable. Key factors are geographical proximity to locations where, because of the inherent activity, aerial observations are likely to occur anyway:

- Airfields (Civil/military).

- Low-flying routes.

- Laser Displays.

- Thunderstorms.
- Possible reflections of light or shapes from water (e.g. lakes) or clouds.
- Marshy (swampy surfaces - methane burn off).
- Possible earthlight sources (e.g.rock formations/earth faults).
- Oil Rig flares.

(U)

Correlation of Incident Reports

26. Multiple witness reports, originating from the same location or adjacent locations, are a strong filter:

- They eliminate any mental illusions of a single witness.
- They enable independent multiple aspect viewing reports to be assessed.
- They enable confirmation of colour, shape, motion and noise.
- If spaced a few miles apart they can enable object velocity to be deduced and eliminate the reliance on, or provide confirmation of, witness velocity assessments.
- Multiple reports can provide up- wind and down-wind sound assessments as a help to identification.
- They can provide positive linkage between visual and radar (or other sensor) detection

(U).

ARTEFACTS & HUMAN EFFECTS IN THE UK

27. When the huge numbers of reports are considered as a whole , the lack of artefacts is a significant mystery - pointing away from the supposition of some UFO researchers who consider at least a proportion of the unexplained phenomena to be from an extra-terrestrial source (or sources). It seems beyond the realms of credibility, if UAP are 'vehicles', from whatever origin, that no one in the UK (or credibly in the wider world) has ever produced an artefact of proven non-terrestrial origin. This implies that the 'extra-terrestrial' entities have totally reliable, 'accident proof' systems extending **over a period of thousands of years**. One might speculate that the only exception to this situation would be if the capability of the perpetrators extended to total transportation and reconfigurability of matter (and beings) and the ability to remove all traces of failed matter/artefacts. The only examples of reliable

surface or human effects noted in the last 30 years, following a UAP incident in the UKADR and described in Department reports, are:

- Substance 'captured' in a jar (see Working Paper No. 22).
- Illness reported following an encounter in Wales.
- Disturbed bushes/hedgerows.
- Car radio inoperable, until UAP departed. (U)

28. The lack of evidence of signalling in the form of electronics communications signals is also an enigma if extra-terrestrial entities are involved. Despite considerable attempts in serious scientific monitoring programmes over many years, no evidence has been found which can correlate with vehicular activity on earth. Either there is none or the 'entities' are communicating using a medium which we do not have or even understand, which seems unlikely, based on all the evidence and the emerging evidence reported in this study. (U)

COLOUR OBSERVED (BODY AND/OR LIGHTS)

Main Shapes [6]	Red	Yellow	Orange	White/ Silver	Blue	Green	Grey/Black[1]	Pink	Mixed Colours
Sphere or Spheres	A M E N L Q	A L R B M E Q	A M F L	E L F N Q	L N	M	F	A	A F B C
Disc	-	-	-	G L s H	L	-	-	-	R
Cigar	D C	-	-	C H D	-	D C	C	-	D
Star/ Point	A	A	A	F J H K	J K	-	-		R
Oval	-	B	-	D H C G	L	-	C	-	R
Triangular Pyramidal Conical	-	-	-	E[3]	-	-	-	-	-
Rectangle	-	-	-	-	-	-	-	-	-
Diamond	-	-	-	-	-	-	-	-	-

TABLE 2-1: RELATIONSHIP OF COLOUR AND SHAPE TO IDENTIFIABLE OBJECT TYPES

/KEY TO TABLE & FOOTNOTES

KEY	CONDITIONS	CAUSE	DURATION	SIZE	MOTION	SOUND
A	Daytime	Ball or Bead (joined spheres) Lightning, Flares	Seconds to Minutes	Small	0 to Fast	[8]
	Night	Moon Through Mist	Seconds to Minutes	Small	Nil	Nil
B	Daytime	Sun Dog	Minutes	Large	Nil	Nil
C	Daytime	Aircraft / Helos[2]				
	Night	Flashing and Steady Lights or Both	Seconds-Minutes	A/C Size	0 to Fast	Wind Dependent
D	Daytime	Airship (No Wings)	Minutes	Large	0 to Slow	"
	Night	Multiple Lights Airship				
E	Night	Birds (Reflective underbellies) seen as triangular formation	Seconds-Minutes	Smaller Flocks	0 to Slow	No
F	Daytime	Balloon / Sonde[4]	Minutes	Small and Large	0 to Slow	No
G	Night	Searchlights[5]	Seconds-Minutes	Small	0 to Slow	No
H	Night	Lasers[5]	Seconds-Minutes	Small	0 to Fast	No
J	Day/Night	Star	Minutes-Hours	Small	Nil	No
K	Day/Night	Planet	Hours	Large	Nil	No
L	Night	Moon	Hours	Large	Nil	No
M	Night	Meteor (often with tail)	Seconds-Minutes	Small	Very Fast	No
N	Night	Space Junk (Re-entry)	Seconds	Small	Very Fast	No
P	Night	Satellite	Minutes	Small	Slow	No
Q	Day/Dusk	Mirage	Minutes	Small	Slow	No
R	Night	Earthlights (e.g. Norway Hessdalen)[7] Methane Combustion over Marshes	Seconds-Hours	Small[5]	Slow	No

Notes:

[1] Reflected/Silhouette.

[2] Slow if viewed head-on or tail-on.

[3] 'V' or echelon formation.

[4] May appear 'flash' if partly coloured, as it rotates.

[5] May be more than one present at a time.

[6] All objects can give the appearance of automatic/random motion, (i.e. jerky/zig zag) around a fixed point due to anti-kinesis if viewed through optics (e.g. camera, telescope, binocular shake).

[7] Yellow form lasts 1-2 hours and changes to new position in 5-10 minutes. White/blue form flashes. Third form has strings of multiple colours moving together.

[8] In the form of crackle, pop or explosion.

	Colours Observed (Body &/ or Lights)					
Main shapes	**Black[4]**	**Pinkish/ White**	**Dull Metallic[4] Grey**	**Red/ Orange**	**Green**	**Blue**
Sphere or Spheres	S	T	-	-	-	-
Disc	S	T	U	D	-	-
Cigar	S	T	U	-	-	-
Star /Pointed	-	T	-	-	-	-
Oval , Egg or Elliptical	S	T	U	-		
Triangular,Pyramidal or Conical [5]	S		U	V	V	V
Rectangle	S	-	U	-	-	-
Diamond	S	-	-	-	-	-

Key	Conditions	Remarks	Duration	Size	Motion	Sound
S	Daylight Night	Unidentified silhouette. Triangle sometimes has slightly convex surfaces and round appendages. No light reflects from within triangle. Shape seen as shadow between lights at extremities.	Sec to mins	[1]	Zero to Fast	NIL
T	Night	Sometimes lights at extremities of triangle, pyramid, rectangle or diamond.	Sec to hours	[2]	Zero to Fast	NIL
U	Daylight	Seen as silhouette or as reflected light from surface of 'body'	Sec to min	2-10m	Zero to Fast	Hum, whine, or buzz
V	Night	Pulsating red or orange light underneath. Green and blue at extremities	Sec to hours	[3]	Zero to Fast	NIL

TABLE 2-2: RELATIONSHIP OF COLOURS AND SHAPES TO UNIDENTIFIABLE OBJECTS

/Footnotes

Notes

[1] Sizes. Triangle at least 150ft. (~15 metres), often up to 250m

[2] All shapes ~5-30m across/diameter, but cigar often much longer. May have single or multiple lights.

[3] Sizes 5-30m diameter. Seen with pyramid. Pulsation rate reportedly increases with velocity.

[4] At night shadow shapes assumed to be black or grey.

[5] Witness uncertainty between triangles, cones and pyramids. Pyramids are usually reported as three sided. Triangles are usually reported as equilateral if the witness is well-educated, or a trained observer. Refer to Working Papers at Volume 2 for description of plasma-type bodies that appear to exhibit total absorption of ambient light – and do not even reflect the light from the normally bright spheres at the extremities. It is assumed that the large prevalence of 'equilateral triangles is the correct description

YEAR	SATELLITES & DEBRIS	BALLOONS	CELESTIAL	METEOROLOGICAL	AIRCRAFT	MISC[3]	UXP[2]	% UXP(Rounded)	TOTAL
1959	1	3	1	7	4	2	4	18	22
1960	-	8	2	7	10	1	3	10	31
1961	16	11	8	20	9	5	2	3	71
1962	11	6	5	8	9	4	3	6	46
1963	18	6	4	4	10	7	2	4	51
1964	43	3	6	-	10	7	5	7	74
1965	27	3	3	2	7	-	14	25	56
1966	38	10	5	5	17	15	5	5	95
1967	49	40	18	28	113	1	45	13	350[1]

TABLE 2-3(a): ANALYSIS OF REPORTED UAP EVENTS IN THE UKADR (1959-67) (846)

Notes:
[1] Of this number 56 were under investigation when the year ended and are not categorised.
[2] UXP = unexplained phenomena
[3] Miscellaneous covers hoaxes, light at edge of cloud - all were explainable

/Table 2-3(b) 1968-76

YEAR	SATELLITES & DEBRIS	BALLOONS	CELESTIAL	METEOROLOGICAL	AIRCRAFT	MISC[3]	UXP[2]	% UXP	TOTAL
1968									280
1969									228
1970									181
1971									379
1972									201
1973									233
1974									177
1975									208
1976									200

TABLE 2-3(b): ANALYSIS OF REPORTED UAP EVENTS IN THE UKADR (1968-76)

/Table 2-3(c) 1977-85

YEAR	SATELLITES & DEBRIS	BALLOONS	CELESTIAL	METEOROLOGICAL	AIRCRAFT	MISC[3]	UXP[2]	% UXP	TOTAL
1977									435[1]
1978									750[1]
1979									550
1980									350
1981									600
1982									250
1983									390
1984									214
1985									177

TABLE 2-3(c) ANALYSIS OF UAP EVENTS IN THE UKADR (1977-85)

Note: [1] Although a House of Lords report quoted, respectively, 477 and 864 for these years.

YEAR	SATELLITES & DEBRIS	BALLOONS	CELESTIAL	METEOROLOGICAL	AIRCRAFT	MISC[3]	UXP[2]	% UXP	TOTAL
1986									120
1987									150
1988									397
1989									258
1990									209
1991									117
1992									147
1993									258
1994									250

TABLE 2-3(d): ANALYSIS OF REPORTED UAP EVENTS IN THE UKADR (1986-94)

/Table 2-3(e)

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YEAR	SATELLITES & DEBRIS	BALLOONS	CELESTIAL	METEOROLOGICAL	AIRCRAFT	MISC[3]	UXP[2]	% UXP	TOTAL
1995									284
1996									595
1997									115[1]

TABLE 2-3(e) ANALYSIS OF REPORTED UAP EVENTS (1986-1997)

Note: [1] Reports received in first 3 months of 1997 only.

CHAPTER 3

STATISTICAL ANALYSIS OF THE UAP DATABASE

CHAPTER 3

STATISTICAL ANALYSIS OF THE UAP DATABASE

"Prejudice will take you further from the truth than ignorance"

Bang Weng Gwang. ChineseJournal of UFO Research

INTRODUCTION

1. The attributes described at Chapter 2 and at Volume 2 in more detail were structured into database tables, in the UAP ACCESS format which is described at Annex D. Some of the **possibilities** for statistical analysis are shown at Annex E. The principle analysis **categories**, considered significant are:

(a) The overall annual monthly and daily frequency of UAP sightings.

(b) The overall frequency of UAP sightings of particular types in particular geographical locations, and from specific platforms e.g. from the air, ground, sea (or over the sea from land), Events with and without sound, with more than one `light' or `beam' and especially those described at close range.

(c) The possible correlation of sightings with specific weather patterns, solar/geomagnetic conditions, local geo-magnetic phenomena, earthquake or tremor events, and weather (electrical storms).

(d) Correlation with other known positions or routes of expected aerial platforms (e.g. proximity to low flying areas or routes, air lanes, airports, military airfields and exercise areas, balloon-launching sites, displays etc). The possibility of obtaining meaningful correlation is influenced by other events which raise public awareness and can lead to gross distortions of the facts. The most obvious candidates are:

- Media hype, which waxes and wanes and may re-occur at any time, given an approximate `trigger'. Examples are `Close Encounter' type films. `X' Files, `UFO' revelations on TV, and the periodic re-awakening of the `Roswell' or `Bentwater' incidents in peoples minds.

- Publication of new books on the topic- of which there were no less than 30 in 1997/8!

- Reports of unexpected or unexplained extreme effects on humans (eg `abductions').

- An identification of those sighting events which have resulted in specific human reactions, including health aspects.

2. Clearly a full statistical examination embracing all possibilities is a major task and beyond the study TORs. However, some of the material to carry out correlations is readily available. Hence, some researched analysis was made, taking into account the possibility that a higher confidence of explanations of UAP events might enable the department to dispense with the task of monitoring UAP events in the future. This proved to be the case when all of the results were finally considered. It is emphasised however that those conclusions drawn can only be as good as the reported data. Further, many **credible** researchers have unsuccessfully attempted to find the cause of 'UFOs' in the past. If a positive UAP link and credible explanation could be found with some natural physical conditions this could end the 'UFO' controversy. However, any such result within the study could only come about as a by-product of the basic investigation to determine the value, or otherwise, to Defence Intelligence.

STATISTICAL ANALYSIS -LIMITATIONS

3. Statistics deals with uncertainty. The UAP problem cannot be analysed as one would wish because:

- Some aspects of data are missing from every event, due to the limitations of the MOD reporting form, the elapsed time, the inevitable variability of the quality of the witnesses (as surprised observers of an unfamiliar event) and the incomplete nature of the reports.

- The natural (meteorological) conditions at the time are only barely known. For example, nothing is known of the pressure, temperature or humidity all of which significantly affect both visual and radar detection.

- It is difficult, if not impossible, to make scientific statements about phenomena which are not fully understood. However it is possible, with scientific knowledge and other data, to eliminate the majority of UAP sightings by correlation with known natural phenomena or manned vehicle activity (or satellites), or man-made artefacts.

4. It is possible, for example, to identify patterns of attributes which are repeated. Brief cross-references with other sources have shown that the reported UK UAP characteristics are remarkably similar to those noted from open sources world-wide. Location and population distribution might be expected to affect the frequency of reporting but the significance must not be distorted by the fact that more reports, although confirmatory, are not necessarily more authoritative in nature.

5. No attempt can be made to consider specific human mental conditions which may have given rise to a UAP report; although attention is drawn to the psychological and temporal lobe effects UAP sightings have on some witnesses, described at Working Papers Nos 1, 2 and 10. Speculation as to extra-terrestrial causes is not entered into. All analysis is made on cold facts.

GENERAL DEDUCTIONS FROM REPORTS

6. For those objects which are not recognisable and therefore unexplained, given a shape, often without range and very rarely with imagery, the immediate deductions must be based on:

- Shape - likelihood of accuracy of description
- Ratio of lengths/widths/heights
- Angles subtended by the object (if reported)
- Colours

7. Although some measure of size is obtainable from angle subtended, mass is never obtainable. The method of motion of UAPs is not obvious and there is much inconsistency in the reporting, due to a variety of mainly human factors. A brief examination of the options, in the absence of sound (thrust), is that the UAP must move by some sort of field-reaction. Intuitively one might propose that this might be with the earths field or the lectrical and magnetic fields present continuously in the atmosphere. Unless there are undiscovered force fields, magnetic/electrical propulsion seems to be the only option. It is noted that the field forces generated on-board a vehicle would have to be significantly high (~ 10^9 Ampere Turns), but unpredictable because of the variation of the earth's own field.

8. From the written descriptive evidence there appeared to be the possibility, excluding those events that could be attributed to a known cause, that UAP, despite often appearing to be so, are not solid objects. Also, conventional science suggests that the energy required to support a solid object would be excessive (within our earthbound understanding of the problem). This, together with other evidence from the reports leads to the supposition that the objects might have little or no mass. One might further surmise that if the object had little or neglible mass, it could be buoyant or semi-buoyant and, importantly, that if it had electrical charge or magnetic properties it might be propelled by interaction with other charges present on the surface or in the atmospheric. Because of the absence of actual UAP field measurements the potential of these possibilities have been examined using the available theory.

DATE-CLUSTERED EVENTS

9. Although it is recognised that a well-described **single** sighting can provide valuable information, an attempt was made to identify firstly months and then days where an unusual number of events were reported. This was done on the assumption that if a large number were reported on the same day there may be some correlation between them, either geographically, in physical description, in motion, or in other attributes described in the individual reports. Further, there might be conducive atmospheric conditions (e.g. weather conditions) for UAP formation which might be identifiable. There was also the possibility that such an approach may expose a means of calculating the velocity of an object (assuming the multiple reports were from the same object and had different times and geographical witness locations). However, the possibility of **more than one such object** seen over the same time bracket cannot be ruled out, as reports are sometimes received of objects breaking into several parts, or of several merging into one. As an initial approach, clustered events were examined for two sample one year periods, separated by a suitable period so as to make them independent (for example) of the same sunspot cycle, of potential environmental changes and of public perceptions due to immediate media effects. For the purposes of the analysis it was necessary to use the data entered to-date (1987-1990 and 1995-1997). During the analysis durations are the period of time the observer (or more than one observer at the same spot) watched the object before it either disappeared suddenly or moved away at low or high speed. Hence, widely dispersed reports are not likely to relate to the same object, unless there is a time-difference which is longer than the expected life of the object and a velocity could be reached which would allow the transit between locations to occur. This is more likely to be possible at higher altitudes. Both event duration and apparent velocity are important parameters. A Volume 2 Working Paper has details of possible upper plasma speeds (e.g. 15km per second) and their duration. The statistical spread of UAP duration is considered below.

ANALYSIS 1987/89

10. Figure 3-3 summarises the days when three or more events were reported on the same day. Of these, seven days saw three or more reports during 1987 (of 121 reports in the year). Of the 366 reported events in 1988 there were 42 days when the number of events exceeded three per day, while 1989, which recorded an overall total of 226 events, had 16 occasions with three or more reports of UAP on a single day. Plots showing typical UAP activity with the time of day, month and year are at Figures 3-10, 3-11 and 3-12.

11. Specifically, it seemed important to determine that if large numbers of events occurred on consecutive days, this may indicate, exceptionally, that, the same objects were seen in more than one geographical area as well as into the next day's reports. This is assuming that the UAP(s) reported were due to highly charged masses which

had not dissipated as quickly as some others reported and may have persisted overnight.

12. In 1988, the most important daily UAP event dates were:

1988	Jan 17	8 Events
	Feb 12	6 Events
	Feb 17	7 Events
	Jun 18	12 Events
	Nov 14	7 Events
	Dec 20	13 Events
1989	Nov 16	7 Events

13. **Jan 17 1988.** All eight events were reported over 30 minute period (1700 - 1730 hrs) starting North of London and moving into Surrey. It seems likely that these were all from the same object.

14. **Feb 12 1988.** The six events on this day were spread in time from approx 1900 to 2200 hours. The earliest was in Northants, then again in Northants 90 mins later. However, an overlap of time occurred (i.e. an object was still being watched in Northants when a UAP was reported in Farnham, Surrey, hence these were clearly separate objects. Another was seen at Ellesmere Port at the same time as another at the Isle of Wight. Hence, there is nothing to be gained in analysing data from this set, from the correlation viewpoint or from attempting to extract a velocity profile. It clearly shows that more than one object is active at the same time at diverse locations within the UKADR. This suggests that, if there is a strong likelihood of many UAP sightings being due to plasmas (such a postulation could only be made **after positively eliminating mis-reports of other causes**) then it also seems likely that conditions can be favourable to form or sustain plasmas in different locations at the same time.

15. **Feb 17 1988.** The seven sightings on this date commenced at 0515hrs and ended at 1245. The 0515 sighting in Yorkshire was followed an hour later by another Yorkshire report, respectively Barnsley and Huddersfield. It seems likely that these were the same object. Nothing was reported during daylight until 1600 hrs in Northants, then later at 2030hrs in London and 2145 hrs in Oxford. But reports at 2130 from Birmingham and Barrow-in Furness were clearly unconnected with the southerly result, as their report times overlapped. It is, of course, possible that the early morning Barnsley and Huddersfield ones were connected and that, with the large

time elapsed, the latter sightings were also connected apart from those with time coincidence in widely different parts of the country.

16. **June 18 1988.** No less than 12 events were reported on this day. All were in Essex and the London suburbs, Surrey, and Herts. In general, around the periphery of GREATER LONDON. Although one report was at 17 30 hrs, all the rest were between 2015 and 2115. These seem to be connected/correlated both in time sequence and location:

20.15 hrs	Hayes Middlesex
20.20 hrs	London(NFI)
20.25 hrs	Godalming (Surrey)
21.00 hrs	Rochford (Essex)
21.07 hrs	Danbury (Essex)
21.10 hrs	Hemel Hempstead (Herts)
21.10 hrs	Norwood (Middlesex)
21.12 hrs	Highgate Hill (Middlesex)
21.15 hrs	Brentwood (Essex)
21.15 hrs	Danbury (Essex)
21.15 hrs	Brentwood (Essex)

17. A track of these events is at Figure 3-1, from which several options can be derived. This cluster could either be connected or comprise separate events. The earliest event, which appeared to move along a track from Hayes to Godalming covered about 19nm in ten minutes. This represents a mean ground velocity of about 116kts (just less than 60 metres per second). This object may have slowed and even reversed its track so as to form the series of reports either which commenced at Rochford at 2100hrs, and travelled NW to Danbury by 2107, or that at Hemel Hempstead, which apparently, from 2110, commenced the NSE sequence Hemel Hempstead-Highgate-Brentwood-Danbury. If it is assumed that this was a straight leg which was close enough to be reported by witnesses at Highgate and Brentwood, as it progressed, the distance of 39nm(72km) was covered at a ground speed of about 465kts (240 metres per second). It is, of course, possible that the object at Godalming at 2025hrs changed direction and moved towards Southend and formed the Rochford sighting at 2100hrs, but was unreported for 35mins. The reader is reminded that the

calculated velocities rule out any wind-borne motion and re-enforce the postulation elsewhere in the report that these objects are most probably moving under the influence of electrical or magnetic attractive or repulsive fields.

18. **Nov 14 1988.** Seven events occurred. Coincidental reports at 00.45 hrs were received from the diverse locations of:

Washington, Tyne and Wear,
Leavesden, Herts
At 0050 Boroughbridge, Yorkshire, then 05.15 from Southend and two reports at 06.15 from Sheffield.
The remaining report was not until 1700 hrs from Nantwich.

The implication is that these were probably independent UAP events.

19. **Dec 20 1988.** Of 13 events the longest, was viewed for ~ 15 minutes and the shortest for ~ 15 seconds. In time sequence they commenced at 1115 hrs (two reports in Co. Durham). The rest were **all** in the evening:

20.05 hrs	Birdlip (Glouc)
23.30 hrs	RAF Leeming (N. Yorks)
23.30 hrs	Dewchurch
23.45 hrs	RAF Leeming (N. Yorks)
23.50 hrs	Richmond (N. Yorks)
23.50 hrs	Richmond (N. Yorks)
23.50 hrs	Scotch Corner
23.50 hrs	Scotch Corner
23.55 hrs	Cheltenham (Glouc)
23.55 hrs	Richmond (N. Yorks)
23.58 hrs	Harrogate (Yorks)

20. A ground track plot of the northernmost events is at Figure 3-2. The evidence suggests that the two Gloucestershire sightings are separate events, as they occurred at the same time and a great distance away from the northern events. Further, if it was a single object it either persisted for almost four hours, or, more likely, represents two

separate objects. If it is assumed that an UAP on a southerly track from Scotch Corner to Harrogate was observed as it passed Leeming and Richmond, it covered some 55km(30nm) in 8 mins, which represents a ground speed of about 223kts (~115 metres per second or ~6km per min.). The UAP may have varied in speed, which explains why it was reported twice within 15minutes at each of two locations. Allowance must also be made for time inaccuracies in public reports.

21. **Nov 16 1989.** All seven reports, with the exception of one from Wales were in the London/SW Essex area and involved both daylight and night events. They were typical of those reported above.

ANALYSIS - 1996

22. During 1996 an unusually high number of reports were received, making this a significant year for UAP since, for example, there is no reason to suppose that mis-reported man-made objects should have been more in evidence to cause 'false alarms' in 1996, than in previous years. In fact, due to the continuing impact of the end of the Cold War, if anything, there was less military flying. Hence, there is no reason why man-made objects should cause an increase, compared with the years preceding or following. It is noted, however, that 1996 was reported as a year with a much larger incidence of meteors approaching Earth and therefore a high probability of these entering the atmosphere. [Although the potential meteor connection with UAP events and , in turn, the potential connection with plasma formation, is discussed elsewhere in the report and specifically below at para 53, where some positive statistical correlation results are reported].

23. **Peak Numbers of UAP** The peak number of reported sightings was 14 on 18th August. Twelve were reported from the evening of 25 February into 26 February and 12 on 1 May 1996. Seven events were logged on each of three other days, six on each of seven other days and five on each of 13 other days. On 21 days there were four reports and on 22 other days there were three reports each day. Of the remaining days in 1996, very few passed during the year without one or two reports. The peak events are discussed below.

24. **25/26 February 1996** The eight sightings reported on 26th were preceded by four logged on the evening of 25th and are therefore treated as a continuous sighting period. A distinguishing feature was the long duration of the majority of these sightings. Long duration always adds to the credibility from the point of view of having time to watch the object for an adequate period to allow a good description. Nevertheless, the event durations exceed what would be expected to be a credible time for a degrading natural event and there is clear evidence that many of the longer events (e.g. sometimes hours in duration) are, for example, caused by visual satellite sightings reported as UAPs. The events of 25/26 February were unusual, in that several occurred in daylight:

	Date	Time	Location	Duration
1	25 Feb.96	1740	Edinburgh	13min
2		1900	Persley	30min
3		1930	Redditch	30min
4		2030	Leith	4min
5	26 Feb.96	0001	Hereford	-
6		0610	Ardmair Bay	3min
7		0732	Birmingham	-
8		1530	Inverness	15sec
9		1530	Inverness	10sec
10		1845	Taunton	25min
11		1945	Inverness	75min
12		2000	Clacton	40min

25. **1 May 1996** All 12 events were over Scotland. Two very late evening events in England on the previous day were well-separated in geographical distance (York and Bedford). However, in view of the high speed attributed to some events, a connection cannot be ruled out, even though the first **reported** event on 1 May did not occur until midday. On the following day the only reported event was 24hrs removed from the Scottish cluster on 1 May:

	Date	Time	Location	Duration
1	1 May 96	1220	Loch Sunart	10sec
2		2119	Edinburgh	2sec
3		2215	Alness	5sec
4		2215	Greenock	-
5		2216	Lossiemouth(ATC)	2min
6		2218	Uddington	6sec
7		2220	Fort William	-
8		2220	Inverness	5sec
9		2220	Lanark	3sec
10		2224	Ayr	-
11		2230	Erskine Bridge	3sec
12		2300	Garve, Lochalsh	1min

26. **18 August 1996** Fourteen reports on this date were preceded by just three on the previous day, two well-separated in time with one on the evening of 17th and one on the following day. This analysis concentrates, therefore, on those on 18th, which commenced at 0120hrs and spread throughout the day to 2350hrs. Three were in daylight, seven in dusk and the rest in darkness:

	Date	Time	Location	Duration
1	17 Aug. 96	2200	Edinburgh	15sec
2	18 Aug.96	0120	Swindon	2min
3		0130	Dagenham	8min
4		1240	Southgate, London	5min
5		1400	Newton Flotman (Norfolk)	1min
6		1800	Kidderminster	3min
7		2000	Bordon, Hants	30min
8		2000	Birmingham	2min
9		2015	Leytonstone E11	2min
10		2028	Liversedge, Yorks	5min
11		2030	Birmingham	2min
12		2035	London W12	10sec
13		2128	Bramhall, Manchester	3min
14		2200	Belfast	3min
15		2250	S.Normanton	-
16	19 Aug.96	0230	Long Buckby	1hr

27. **17, & 21 July and 21 August 1996** Seven reports were received each day. On 17 July five of the seven reports were in daylight, with locations varying from, Scotland to Plymouth, N Wales and Northern England. On 21 July three of the reports were in daylight, and covered locations from Tayside to Southampton, Manchester and the London Area. On 21 August reports came in from Yorkshire, Lancashire, Wales and the London Area. From experience those events which last for more than an hour are probably planets.[See item 16 at para. 26 above, for 19 August].

UAP EVENT REPORTS BY UK MAIN REGIONS

28. Table 3-1 shows the event reports by UK main region. This is of limited interest, apart from the variations in population density, which is a key factor in witness opportunities. Further, during the Summer, Scotland has longer periods of daylight than either England or Wales and much lighter nights. If one ignores the possibility of Earthlights (which are near the surface in rocky regions) this, intuitively, suggests a lower number of sightings if dusk or darkness are a pre-requisite for higher elevation sightings. The occurrence of Earthlight activity (as both Wales and Scotland are predominantly mountainous) might have been expected to have shown some statistical evidence of reports which could be attributed to this cause but did not do so. In Scotland the bright phenomenon of the Northern Lights (Aurora Borealis), can itself not only affect visibility (reducing the probability of seeing light coloured objects in the sky) but can, conversely, also lead to spurious UAP reports. Therefore, for several justifiable reasons, any lack of numbers of sighting reports are not necessarily an indication that UAPs were **not** present - as most of Scotland is sparsely populated and many of the mountainous, forested and hilly areas away from the coast, and at lower altitudes, are often screened from both radar and human coverage. In

summary, lower UAP event numbers reported are therefore not necessarily evidence of UAP inactivity. Clearly, those events close to borders (eg Scotland/England and Wales/England) can be reports of the same objects but reported separately on some occasions from both areas.

GEOGRAPHICAL LOCATION ANALYSIS

29. Because of claims that UAPs, allegedly, have an 'interest in strategic sites' the frequency of reports originating from important geographical locations was examined. This could be a onerous task, since the obvious initial filter (postcodes) is missing from most of the reports and the attachment of a code to the thousands of reports, from an often approximate address, would be a considerable manual task. To avoid this an automated approach was taken using repeat place names, to determine whether they formed geographic clusters in areas of particular strategic interest. This method is not exhaustive in its basic form, since reports could come from a main location on one occasion (e.g the main town) and then from its suburbs (i.e with a different name) on another occasion - thus appearing to be from the different district names and not to be repeat visits. To obtain a good spread this investigation was over a four year period, for ~850 events and included the latter part of the Cold War.

30. The results for specific location repeated reports are plotted at Figure 3-3, and expressed as a percentage because of the wide variation in the number of locations. From this it is noted that, while hundreds of locations were 'visited' only once, between 60 and 70 locations were 'visited' twice (that is, two UAP reports were received during the four year period with the same place name), while at the other end of the spectrum the London area as a whole (taken as a single location), produced 43 reports in the same period. In considering any reports, clustered or not, it must be noted that a proportion could be due to misreporting of man-made objects and thus unless positively separated by analysis, are irrelevant as part of any investigation into the repeat appearances of genuine **unidentified** phenomena.

31. Any analysis must clearly be interpreted with care if meaningful results are to be obtained. For example, reasonable and credible account must be taken of increased population and aircraft density (leading inevitably to false reports) in some areas and the presence of likely places 'of interest' to (in the extreme) 'terrestrial entities', as is claimed in some quarters. It is instructive, for example to examine the scatter plot at Figure 3-4, where a random sample of UAP events over several months are shown as dots. Note the significantly higher densities near to towns and in the air corridors and ATC Control Zones. The solid lines on the map indicate the approximate centres of the civil air traffic corridors. It should be noted that an increase in density in the areas shown could be due to:

- Increased population density

- The fact that UAP, (if they are charged buoyant bodies), are likely to be attracted to airspace which contains a regular passage of aircraft. There seems to be a possibility that either the initial formation (or the subsequent life of a plasma UAP) may be affected by the presence of larger amounts of charged particles in the air over large cities and the airspace where large numbers of aircraft are flying.

- Distractors in the form of aircraft by day or night which are misreported as UAP.

32. Locations where a presence of trained observers - for example, where trained observers such as personnel interested in spotting aircraft might be present and distort the number of sightings (as they might be expected to be scanning the sky more often), should also be considered. UAP events reported from RAF Stations were examined, for example, for a four year period for a repeated UAP presence. Only six widely-dispersed RAF Stations reported one event each. These locations were found to operate in a variety of roles, rather than together representing a group with specific strategic (for example, nuclear) importance, which some have suggested attract higher than expected UAP activity. The RAF Stations which reported were Valley(Advanced Flying Training), Swinderby(Non-flying recruit training), Waddington (V-Bombers at the time), Leeming(AD), Dishforth(Flying Training) and Newton(Ground Training). It is probably the case, because of the radar and visual look out maintained, as part of the normal role of the station, that in most cases if any UAP is present near a RAF Station, it is quite likely to be seen and reported. From the information examined:

- Contrary to certain media suggestions that there is some sinister UAP agenda that there are repeated UAP visits to locations of national importance, no evidence has been found that RAF strategic sites are some sort of target at which UAP appear more often than over certain other areas (e.g. over highly populated areas or along air corridors)

- There is no evidence that regular or irregular repeat visits occur at any RAF site, strategic in nature or otherwise.

33. Alternatively, each of the 66 locations found during the analysis which provided even just two reports were examined to see whether they were (or still are) of particular importance and might even warrant, for some special reason, more than one occurrence by a UAP. Further, whether any of these locations could possibly have any local characteristics which might be connected to either the initial formation or the 'attraction' a UAP (due to some local characteristic, e.g. dust plasma, electrical power lines, earthlights etc). [Notwithstanding the fact that the place where a UAP is formed might not be the place where it is seen]. An examination of the 66 place-names where UAP have appeared twice, does not appear to focus on any of special strategic military interest. **There is, therefore, no firm evidence which points to the repeated presence of UAP at, for example, US or RAF strategic or tactical Bases**

(airfields), Army assets or RAF or Naval HQ or special assets (in particular, at nuclear assets, such as Faslane, Aldermaston, Capenhurst, etc). A UAP at Devonport was reported twice, but no particular significance can be attributed to this. The fact that UAP are seen at all, at some Service locations, is undoubtedly because they are manned 24hrs a day with staff who are likely to be observant by virtue of their normal tasks.

34. **Events Several Times at the Same Location** Although **three** reports came from each of 26 different locations, none appear to have any particular Defence significance. Of those (nine) locations, which each reported four times, it is noted that these are either actually at, or quite near to airports (Glasgow, Edinburgh, Gatwick, Slough, Hayes, Bridgend (Cardiff)). It is suggested that this increased frequency of reports could well be attributed to a number of causes:

- The presence of aircraft (possibly attracting plasmas)

- The increased presence of aircraft leading to the misreporting of aircraft as UAP.

- The attraction of UAP (as plasmas) to attracting electrical items on the surface or in the air. (These might comprise enhanced charged air-particles in the vicinity, large metallic structures such as hangars or electrical facilities on the ground).

- The likelihood of regular observers of aircraft to notice 'unusual aircraft', the presence of aircrew and air trafffic control staff.

35. **Higher Numbers of Reports.** Similarly, those locations from where five to eight reports were received over the four year period do not show any specific strategic military or civil significance. The seven events from Rotherham and (as in May 1998), as well as reports from Sheffield might indicate at least some 'earthlights' (near Moors earth-faultlines) but neither locations have any nationally strategic sites nearby. Only five locations reported nine or more events, respectively, Birmingham (nine), Manchester (ten), Hull (12), Sheffield (15) and, already mentioned, the Greater London Area, 43. It is again noted, that being high density population centres, these will inevitably generate more sighting and reporting opportunities, airports and overhead air corridors feature strongly in all locations. None of these locations are of nuclear strategic significance. Although they are of major civil importance as centres of national or regional government there is no evidence to locate the UAP reports as being specifically close to any buildings or infrastructures of any particular significance, rather, as can be seen at Figure 3-4 the scatter of locations seems to be more or less random within these areas.

NUMBERS OF OBJECTS PRESENT PER EVENT

36. Frequently, more than one object is present at the same time at one event. For example, in a 1987/91 sample of over 850 events, two objects (lights) were reported together on about 8% of occasions. The distribution is plotted at Figure 3-5. In 1996/97 the number of objects at any single sighting was smaller overall. However, two were seen on 13.5% of events and as many as eight objects in total were viewed at once on each of four occasions. Often a witness is uncertain of the number of objects, especially if they are 'manoeuvring'.

UAP LIGHT & COLOUR ANALYSIS

37. It should first be noted that colour may be seen alone, with its own inherent overall shape, or as a colour which is (or appears to be on) on a larger body. Often reports state that the object is exhibiting two or more colours, or as a colour apparently being 'carried' on (the surface of) an apparently 'solid' entity. Reference is made to Figure 3-6, where a colour analysis was made of over 700 events during 1996/97. On 47 occasions (6.6%) no lights were reported - that is, the UAP were perceived and reported as solid entities in the atmosphere. Of these events, 33% were reported as 'white'. The implication is that what is seen either represents a genuine white source, (for example, a white 'lamp'), a reflected source, (for example, of white light from another source, eg. from the sun) or finally, an object with a colour temperature high enough to produce white light. Many people are colour blind to some extent, hence together blues/greens, blues/blacks, yellow/orange/amber, grey/black, and silver/white can easily be misreported.

38. Grey or black indicates opaqueness or solidity to most observers, although it is shown in Volume 2 that the prevention of the reflection or passage of light can also occur for a gaseous/plasma entity, which would then give the **appearance** of a solid object when there is no such solid object is present. The other colours are less consistent with the idea of reflection. What, for example, is the source of a green beam which could reflect from an airborne body and be seen omni-directionally by several witnesses? Hence, it is clear that the red, yellow, orange, blue and green sources observed, (aircraft navigation lights (lamps) excepted) cannot be simple reflections but are inherent colour temperatures **or** are the result of colour filtering due to the physical 'construction' of the entity - which, it should be noted are frequently reported as being in motion, such as rotation. It is noted that, in certain conditions, red, yellow, orange and even blue light, can be associated with jet aircraft exhausts. However, these are easily eliminated as UAPs by the concurrent presence of a positively recognised sound.

39. **Visual Beam Emanations from UAPs.** Reports are occasionally made of 'beamed lights' and sparks (of various colours). If the UAP is near to the ground these are invariably described as 'being used to **inspect** objects on the surface' or 'a beam was **used** to shoot at me' - or **they** 'shot at me with a beam'. An almost

constant factor in these reports is that the human observer is very close to the object and almost certainly simultaneously within the influence of any other (invisible), e.g. magnetic field, which might be present. The potential field effects are explored at Volume 2 Working Papers 1 and 25, with an unexpectedly positive outcome. Characteristics of the 'lights' seen are shown at Figure 3-7.

40. This 'beam effect' is never reported when object's altitudes are higher than about 2,000 feet. When a beam is reported it is often described as a 'searchlight' (on occasions these are shown to be misreported aircraft landing lights). While there is insufficient reported data or indeed imagery for analysis, these 'beams' usually appear to be slightly divergent. It is suggested that where these objects are plasmas the beams described by witnesses could well be the discharge paths taken by charged particles which have found a way to escape from the confining forces within the plasma. Because the objects (i.e. the presumed buoyant mass) do not consistently accelerate away when this occurs, it is surmised that this emanation does not necessary represent any type of viable thrust, but is most probably what amounts to a charge leakage. On other occasions some sort of internal change seems to occur. The object apparently becomes more bouyant and as its residual charge has probably changed it moves away, sometimes at high speed and climbing. Indeed, in the interim the objects frequently 'hover' when this effect is observed, almost as though tethered while this discharge is going on. It is also likely that the discharge path contains dust particles which reflect any ambient light while this is taking place.

41. Often sooner rather than later, the object fades and disappears from view, sometimes re-appearing briefly. Although UAP motion is sometimes described as an acceleration away, it seems more than an anomaly that the object never seems to accelerate towards the observer - only away. This leads to the suggestion (and strong suspicion) that if an object rapidly diminishes in size (shrinking in diameter), giving the impression that it is fast-receding. This is re-inforced by the suggestion that the discharge has changed the balance of sustaining forces to a point which causes the shape of the object to collapse. Sometimes this is accompanied by a small explosion. This, in turn, gives rise to the supposition by the witness that he/she has heard a sonic boom, or has even been 'shot at' as the object sped away. The former is an obvious illusion - as any accompanying shock wave would be moving away, not towards the observer! It is concluded that there is no doubt that some UAP either emanate a beam of light which comes from an internal source, which, for some reason is not an omni-directional emission, or alternatively emit particles in a beam which, in turn reflect ambient light, thus appearing to form a beam of light. It is strongly suspected that a coincident electrical or magnetic field is emitted at the same time which can adversely affect some electronic and electrical equipment and the neural activity in humans.

UAP SOUND & SMELL ANALYSIS

42. The incidence of sound ande smell reports is low. In one sample of events on only 29 occasions out of over 700 (2.8%) were sounds reported. For another sample of 1014 events (1996/7), 46 reported sound (4.5%). For those UAP which are not identified later as aircraft the sound is invariably reported as 'humming', 'whining' or 'crackling', or electrical and these amount to only 1.1% overall. There are various reasons for lack of sound when aircraft are seen. These are considered at Volume 2 Working Paper No 8. The presence of odours (usually an obnoxious sulphurous smell) is very rare in UK reports and would only be sensed if the observer is quite close to the explosive demise of a plasma in relatively still air.

UAP SHAPE ANALYSIS

43. Figure 3-8 shows the shape analysis for 1014 reports for the 1996/97 period. Shapes were observed on 67% of occasions. It is noted that the shape may be that of the coloured light itself, where a 'light' is the only item seen. Alternatively, the shape may be on or in a body which also has lights/colours, or the shape may be a silhouette, with or without 'lights'. In combinational reports the object shape is often described as 'bright' (e.g. 'bright red sphere'). The shape may also be defined by an observer from several individual objects which form a shape (formation) but are individually generally round. Hence, three objects which become a triangle when viewed in plan together form a 'line' or 'bar' or even a 'cigar', when viewed sideways-on.

UAP MOTION ANALYSIS

44. Whereas satellites, meteors and manned aircraft exhibit a generally linear or curved flight profile, UAP produce a number of profiles, some of which match those of manned aircraft. These not only include 'hovering, but other motions that no manned vehicle could achieve. Figure 3-9 shows UAP motion analysis for a four year (858 event) series in the period 1987-91, where other than simple linear motion was observed. The following points are relevant:

- None of the events reported UAP **diving** - thus eliminating **diving meteors with visible trails.** (Most of the public know the difference anyway as these are seen nightly if the visibility allows, however see correlation with meteors below)

- Almost 10% of the events **climbed** - indicating negative buoyancy or lift from some force (e.g. due to electrical charge differentials). [Note also the natural affinity, reported in a Russian Open Scientific Paper at Volume 3, for (aerosols) plasmas to take up an 'aerodynamic' shape, possibly producing lift].

- Almost 22% of the reports (when combining slow, stationary and hovering) were expressy perceived by the witnesses **NOT** to be aircraft.

- About 9% were **moving fast.** [This eliminates satellites, which, when observed from earth, exhibit steady, rather than 'fast' motion.]

- A small percentage (~1.6%), were described as **'bobbing'** (sometimes as **'erratic'**). This condition, which admittedly can be due to optical propagation 'tricks of light', such as 'twinkling', indicated instability and eliminates aircraft. The public are well-aware of aircraft strobe lights. Further, the 'bobbing' motion is usually described as random.

- Some 14% of reports indicate **'spinning'**. This can be confused by some with **'pulsating' (1.6%), and by others who reporting a stationary light flashing on and off regularly as 'rotation'.** Taking these factors together, this indicates some sort of turmoil/turbulence within the object which is often consistent with the variability which might be expected in gaseous formations in motion, due to internal changes caused by both internal and external forces. It is also noted that the general public, in context, are more likely to **expect** any object seen to be 'spinning' rather than any other motion because of the widespread 'spinning-top', flying saucer analogy used by the media

45. In a proportion of the UAP events a combination of motion characteristics reportedly occurs. This often depends upon how long a UAP is observed by a single observer before it passes out of sight. For example, initial deceleration, followed by slow movement, 'hovering' (or the appearance of doing so), followed sometimes by either acceleration, disappearance or even explosion. During the phases of observation colour mixtures are often seen and colour changes occur during the period of observation. This indicates that the objects nature is in constant agitation. Indeed as many are reported to rotate the UAP is being viewed from all aspects, repeatedly showing all it's variations in colour.

CORRELATION STUDIES

46. **With Time of Day** As events are almost always first detected visually, it is no surprise that the greater proportion are sighted after dark. For example, of the 1014 events from 1996/7, 94% of events were seen first as lights and, as can be seen from Figure 3-10, a very high proportion are seen in the hours of dusk and darkness. One breakdown is shown at Table 3-2, taken as a sample of some 850 reports, between January 1987 and July 1991. Approximately 64% were reported during the hours of darkness, 19% in daylight 10% at dusk. About 6% were seen at dawn. These figures do not necessarily mean that UAP activity is influenced by the presence of darkness and that they are not present through a full 24 hour period. Sightings are also heavily dependent on viewing conditions:

- Visibility

- Contrast in daylight

- Luminosity of the object, compared with other lighted objects in the sky.

- The presence of motion.

- Availability of witnesses - This is dependent, not only on the prevailing weather conditions but also on population distribution.

47. The second sample was taken over ~700 event reports in 1996/7. In this example, perhaps predictably, almost 80% occurred during the hours 1800-0600. It seems that, for a maximum probability of being reported, either dusk and darkness is required. While there are not necessarily large numbers of people outdoors at any given time in the evening, (in fact there may be far less than in the daytime in most places), those present are more likely to see UAP because the sighting conditions exist. However, there is no evidence that UAP form at any particular time of day. Because of the wide range of UAP durations reported, it is possible that the life-span of some extends from daylight into dusk and darkness and vice-versa. Whatever their origins the statistics show that the number of UAP reports increase as dusk progresses into darkness, peaking at the time people are returning home after an evening out, walking the dog, etc., between 2200 and 2300hrs. Thereafter, with most people in bed the levels fall. This does not necessarily mean that there are less UAP about. Although there is no absolute evidence that this is the case, it seems most likely that UAP distribution occurs more or less throughout each 24 hours period, notwithstanding any peaks and troughs if the cause of UAP is due either to meteors or electrical conditions; both of which are variables (see Working Papers Nos. 2, 13, 17 at Volume 2). It is a fact, taking all known characteristics into account, that:

- Most of the 33% 'white' objects reported would not be seen in bright daylight, unless they were close to the observer.

- Only those objects attracting the eye's attention with adequate contrast with the viewing backgound are likely to be seen. [Pink/silver (against a bright sky), blue (against a blue sky), or yellow/orange (in a sunny sky) would be less likely to attract the eye's peripheral vision.

- Although motion attracts the eye, unless a visible, contrasting colour, is also present, any motion will be irrelevant.

- Aircraft lights- even if operating in daylight- will not attract attention by themselves. Their contrast will be much less than in darkness, coupled with the fact that an observer in the open will only be attracted if aircraft sound acts

as the additional cue. [Hence, aircraft lights as a cause of UAP mis-reports are eliminated in daylight].

- A large percentage of UAP reports at any time - day or night, are fleeting, often less than 5 seconds. The certainty of a witness is higher at night, than in daylight, because of the colour/darkness contrast. In daylight, even a second glance may not confirm the presence of anything unfamiliar, the object may have disappeared, dissipated or just moved quickly away.

- It is noted that the large triangular, oblong and diamond shapes reported at dusk or in the night do not appear in daytime reports.

48. The statistical distribution values obtained do not therefore necessarily mean that UAP presence is not evenly distributed through the full 24 hour period - or at least more evenly distributed than the probable skew caused by the contrast in the marked difference in visual detection conditions occurring between day and night. As a comparison with the earlier analysis, the 1996/97 analysis breakdown is: Daylight (0600-1700) ~17%, Midnight to 0600, also 17%, with over 56% between the hours of 1800 and midnight. Seasonal time variations have not been investigated but monthly values are considered below. Irrespective of these factors is is clear that sightings are a function of:

- Visibility at all times of day or night.
- Contrast in daylight.
- Luminosity of the object to attract attention.
- Presence of motion.
- Availability of witnesses - a function of population distribution and presence in a viewing position.

49. **With Month of Year** Figure 3-11 and Table 3-3 show the distribution of UAP reported sightings by month of the year, taken over a ten year period. The pattern is consistently clear that the number of reported events peaks during February and in the autumn and falls for about two months in April/May. Until the Meteor statistics were developed there was no apparent or obvious reason for this, apart from the fact that, from the visibility aspect, **fewer** UAP sightings would, as explained elsewhere, be expected when the weather is very bright, or when the evenings become lighter. However, more opportunities are available when the weather is warmer than in the spring and more of the population is likely to be outside in the evening/dusk, for example, in the autumn. This did not explain the peak UAP reporting, centred on February for most of the years plotted, until the results at para. 53(Figure 3-18),

below, were obtained. Table 3-4 shows the distribution of days per year with no reports.

50. **With Weather.** Weather statistics for the whole of the UK have been briefly analysed against UAP sightings, with the specific intention of searching for correlation between atmospheric conditions and days on which UAP events occurred. The information available from 23 weather stations included temperature, precipitation, sunshine, fog, snow, thunder, frost, dew point and pressure. Although the work involved to make a complete analysis (and the possibility of identifying conditions for the formation and sustaining of a UAP) is beyond the scope of this study, an initial analysis was made of the most obvious factor - that of the potential of enhanced electrical conditions in the atmosphere. A correlation was therefore sought between the incidence of thunder recorded in the weather statistics (and dependent on lightning) and UAP events. As these could not be done locally for every event, they were normalised as the numbers of days per month of thunder against UAP report frequency. Conversely, an analysis was made of days when UAP events occurred when there was no thunder. The results are plotted at Figures 3-13 and 3-14 for the years 1988 and 1996. They show that **UAP can occur when there is no thunder (lightning),** for example, in November 1988. December similarly shows a large number of UAP with a very low, negligible thunder rate. However, for the overall year the correlation co-efficient was -0.43 which shows that very small values of one set of data are connected with large values of the other set. When this was repeated for 1996, which was a year with more sightings and a preferable statistical situation, the correlation was positive (+0.62) showing correlation between thundery days and UAP reports. Finally, the sequence was repeated for 1988 for days of thunder against days when **no UAP reports were received**. This showed only a very weakly positive (0.19) correlation, meaning that the large values in one set are associated with the large values in the other set. In basic terms this shows that a large number of days can occur with no UAP even though it is thundery. The conditions for lightning occurred on those days but ball/bead lightning was not formed - or at least was not reported! **In summary it seems likely therefore that while a number of UAP reports are a result of misreported ball lightning (which is a rare phenomenon for most of the population), there are many occasions when UAP reports are received when there is no recorded thunder conditions and hence no enhanced electrical activity in the form of lightning. On these occasions (other man-made objects excepted) UAP must be caused by something else.**

51. **With Solar Activity** Because solar activity affects the earths atmosphere and electromagnetic propagation conditions it was investigated to ascertain whether the frequency of UAP reports could be correlated to solar flux, sunspot number or geomagnetic conditions. Some example plots are shown at Figures 3-15(a) and (b). It was postulated that some events, possibly many, might be plasmas' with their associated electrical fields, (and charged particles), so an examination was made of the UK daily Sun-Spot Numbers (SSN) and the geomagnetic flux (FLUX), compared with the daily number of UAP events. For convenience of the presentations of results,

this was done in 2 monthly (i.e ~ 60 day periods), for the overall period Mar 1995 to 1997 i.e. x 2 monthly samples. However, the overlap periods of the plots were also investigated - in case correlation happened to occur at one or more of these periods. Cogniscant of the fact that the appearance of UAPs transcends our terrestial calender, [which is purely a convenient set of markers to use as a time scale in this case]; data was investigated for possible relationships which might be significant:

- Direct correlation of UAP events within either high, level or low SSN, or FLUX periods.

- Apparent trend correlation of UAP events with the longer solar cycle trends. (To carry out this fully would ideally require at least 22 years of results; as the solar cycle lasts 11 years!)

- The possibility of a delayed correlation if the UAP event curve is shifted to the right (to test for UAP increased frequency of reports after the high (or low) solar activity).

- The probability that UAP events occur due to an amplitude change but not necessarily consistent with solar peaks or troughs.

- The probability of a correlation when the SSN/FLUX reaches a minimum level or, conversely falls below a certain level; or remains level (i.e. constantly high or low) over a correlated period of reported UAP activity. It is reiterated that this can only be a loosely based analysis because of the possibility that many more events have occurred, possibly in geographical clusters and possibly on certain days - but these have not been seen; or have been seen but not reported.

52. **Results** No direct solar correlation was established. Much more work would be necessary to establish whether combinational effects are responsible - for example combinations of certain weather conditions. However, the tentative link with meteors (see below) seems more tangible.

53. **Correlation Studies - Meteors** While it has become clear during investigations that a large number of variables are involved in the consistency of UAP reporting, and it is acknowledged that there are likely to be more meteors mis-reported as UAPs when, for example, the sky is clear, the weather is fine and warm (inducing more people out of doors in the dark), and when there is a higher forecast meteor activity; further analysis of the reports and correlation with UAP dates, has revealed some interesting facts which may have a direct bearing on at least one possible cause of the unexplained object phenomenon.

54. Meteor activity is continuous in the earth's atmosphere. Every year it is estimated that some 40 tons of matter hits the earth's surface, but this is only a small

proportion of that which enters the atmosphere and, in theory is said to burn-up. If it is postulated that a proportion of the material neither impacts the surface or burns complet up it is necessary to conjecture what form this might take, whether it exists at all and how long it might persist if it exists in another form etc. It is not clear why there is a dearth of information in the scientific press on this possibility. It seems unreasonable to assume that all meteors will either burn up completely or reach the surface, without the possibility of some intermediate state. It also seems reasonable to assume that any material which, having sped through the atmosphere at enormous velocity and attained a very high ionisation temperature, must exist in gaseous form before dispersing. It is postulated that it may, instead of (or as well as) forming a gaseous plasma viewed as a visible luminous stream, form (due to variations in atmospheric density and other factors) a single or several plasma bodies. A plasma is a charged body of gas. Rather like ball, or bead lightning, which is formed during a lightning strike it seems possible that multiple rather than single gaseous entities may be formed which might be seen as visible shapes. Meteoroid definitions are at Figure 3-17.

55. It is postulated that a plasma formed from the vaporisation of a solid meteor of sufficient size will comprise millions of particles. These particles will have collected an electrical charge due to a combination of friction and currents which could be expected to flow as the stream passes through both the earths natural electrical field and any other enhanced fields that may be present at the time due to electrical storm activity. Many meteors are of no consequence being microscopic in size. They would not produce a plasma with sufficient energy. However, some of the meteors which have reached the surface as meteorites are known to contain magnetic and other elements. On entering the atmosphere they may already have properties (e.g. electrical or magnetic currents) of unknown magnitude, of which we are unaware and which may influence their final form as they come towards earth.

56. **Similarity to UAP**. While lunar activity generates ambient light and this determines, even on a clear night, whether the meteors can be seen as they approach, it is assumed that statistically, seen or unseen, meteors will enter the earth's atmosphere at any position around the earth. They will either completely burn up, impact as meteorites or, from the rationale above, it is therefore suggested that under certain conditions the residual material from a meteor could form a buoyant plasma or 'fireball' in the lower atmosphere. During its life, and before natural dispersion, it is likely that such an object would be reported as a UAP. Meteor arrive singly or in multiple showers. These often overlap for significant periods during the year. A plasma formed as described above would appear to have most, if not all the attributes of the objects which are regularly reported as UAP. Therefore, the investigations and findings related to meteors are of special interest.

57. Details of meteor activity are constantly monitored and meteor showers can be predicted using the Meteor Shower Calendar, produced by the International Meteor Organisation (IMO). Meteor shower data was obtained for the years 1995-1998. As

explained in the Working Paper at Volume 2, there are both predictable meteor showers and sporadic meteors. An investigation was therefore made into the incidence of UAP reports and the arrival of one or more coincident meteor showers. According to the IMO there are 38 named meteor showers which were forecast to arrive in the year 1996. Since this was a high incidence year for UAP reports it was appropriate to make statistical studies for this year.

58. Meteor showers arrive singly or in multiple showers. These often overlap for significant periods during the year. For 1996 up to eight named showers arrived at the same time and lasted for a period of several days, sometimes for up to 30 days. However, it is important to note that the showers build to peaks on specific named days. Each type arrives with differing velocities and different densities (rates per hour). The arrival of meteors in the atmosphere is the cause of meteor **trail reports which are often visible to the unaided eye.** As most members of the public are aware of and recognise them as such, they do not report them as UAP. The object of this part of the study was to ascertain statistically whether there was an increase in UAP reports **when meteor activity was high** but when **meteor trail reports were low**. This would suggest that the public reports would most probably be as the **result of meteor activity** even though the reports did not report meteors. If it could be further shown that a statistical variation of UAP with meteor activity exists, then this would explain many of the hitherto inexplicable UAP events and re-enforce the exceptional correlation which was becoming evident with the attributes of gaseous plasmas.

59. For analysis it was assumed that, statistically, the phenomena was likely to occur when the IMO predictions suggested that:

- Several showers of different types occur at the same time.

- A meteor 'peak day' occurs.

60. Some significant 1996 correlation results are plotted at Figure 3-18. The curves show three sets of data, plotted, for convenience, in increments of five days: the UAP rate over each five day interval, the coincident number of different shower types in the same five day interval and, finally, the hourly meteor arrival rate forecast within each five day period. The maximum five-day rate for UAP reports in 1996 was 30 and the lowest was zero. The maximum number of coincident meteor showers was eight. The maximum arrival rate was 143,000 per hour, boosted particularly by 'Geminids', 'Quadrantids' and 'Perseids', each contributing over 100,000 meteors per hour when they were near. Even the least active shower releases 2000 per hour. It should be noted that although not all meteors will approach UK airspace, when the highest density rate is expected then the probability of an increase in UAP reports is clearly present. The objective is to discover whether this ic coincident with a correlated increase in UAP reports

61. From the Figure it is immediately evident from the coincident rise and fall of the curves that there is correlation between the number of meteor showers present and the meteor hourly rate (known as the ZHR). This is expected. The important fact is the correlation between the meteor curves and the UAP report curve The mathematical correlation taken over the year is over 60% (0.62). **This is a reliable positive correlation which would probably have been much higher if man made sources of UAP reports were filtered out.** As has been proved, many reports will be due to over 20 types of other natural aerial phenomena, plus man made phenomena, ranging from lightning and fireworks to laser displays. Perhaps an even more stringent test is that of comparing the actual dates of peak UAP sightings with the actual dates of the meteor peaks, rather than those grouped into 5 day intervals:

Meteor Peak	UAP Peak	Meteor Velocities (km per sec)
January 4	January 7	28, 41*, 65
February 7	February 8	23, 30, 56*
February 25	February 26	23*, 30, 56
March 14	March 18	23, 30, 56*
March 25	March 30	30*
May 6	May 4	30, 66*
August 18	August 18	25*, 31, 34, 42, 59, 66
November 13	November 13	27, 29*
November 25	November 25	27, 28, 29, 60
December 6	December 6	22, 28, 40*, 42, 58
December 14	December 14	22, 28, 35*, 40,42, 58, 65

Note : * indicates that this day was a peak for that particular meteor shower type. However, at present, with insufficient evidence, there is no suggestion that one meteor shower type is likely to cause UAP to form, more than any other.

62. Significantly it is noted in conclusion that the correlation is date-exact on several occasions and nearly so on the others. There seems little doubt, therefore, that natural UAP reports are correlated with high incidence of meteor activity and, from this evidence it seemed a strong possibility that meteor activity accounts for some UAP reports.

63. It is noted that the co-incidence of peak meteor dates and UAP reports is statistically very high and cannot be due to chance. The fact that sometimes the UAP peak occurs before the meteor peak is not a problem - it is merely that, as the meteor peak date approaches and the entry rate increases, more UAP are seen on adjacent days, than on the peak day itself. This variation could easily be due to the weather (overcast and low visibility) and that (meteor-generated) UAP did in fact occur where there was no one to see them! - or just that the meteorological conditions present in

the atmosphere on the meteor peak days was not suitable for plasma formation. The other key factor, of course, is that gaseous body plasmas did not fall within the airspace of the UKADR on that day - or even if the opportunity to form a plasma occurred, it's subsequent reporting was not viable. The position at which a plasma is eventually formed, assuming a meteor does not burn-up or impact after diving, must depend on the angle of entering the atmosphere, the velocity and the atmospheric conditions (e.g. temperature layers, dust, electrically charged layers, wind). It is clear that an observer noting the falling trail of a meteor may be hundreds of kilometres from its eventual landfall.

64. The final meteor-related investigation was to examine each of the UAP reports on the peak dates to ascertain that they were not merely reported as meteor trails, but more tangible and representative of the exceptional bodies often reported.

RESULT OF METEOR INVESTIGATION

65. **The investigation showed that on only 27 occasions out of 1014 UAP events reported for 1995 and 1996 did UAP have 'trails', 'tails' or were 'comet like' or 'meteor like'. Many of those with tails were reported not as meteors but as other types of event which happened to have tails. It is concluded therefore that the pblic are well aware of the difference between a familiar meteor trail and an unusual phenomenon. It is not unreasonable to suppose that, disregarding any man-made objects which were misreported during 1996 (and in other years) there is a high probability that the remaining events were largely due to meteor plasmas. Some may have been due to other atmospheric electrical events such as lightning. The peak reporting periods which co-incided with meteor shower peaks were not mistaken reports for falling meteors, but were clearly events which occurred after the plasmas had been formed, were usually at low altitude and exhibited the regularly-seen erratic, bobbing, hovering and climbing motion which would not be mistaken by the public and other credible witnesses.** In fact, it is clearly to the public's credit that they rarely report meteors as UAP.

HUMAN FACTORS

66. No attempt has been made to separate so-called credible reports from all others, as in intelligence analysis **all information, however innocuous, is valuable for correlation purposes until decided otherwise by the analyst.** For the sample of events taken from the period 1987 to 1991, 36 reports were from Police Officers, 278 from witnesses in declared professions, many from ex-servicemen and women, only nine were from 'ufologists'. These together with all reports from undeclared observers were treated as corroborating evidence where possible in individual cases and as a body of reports which cannot be ignored or dismissed lightly. In the 1014 1996/97 reports 15% were corroborated and often were seen at the same time by a dozen or more witnesses who must be considered reliable. Very few (for example 1.2% in a sample of over 1000 UAP events) were seen on the surface or close enough to surface objects to cause surface effects to the countryside, property or to humans.

Exceptionally, some railway sleepers were set on fire and sometimes the ground was scorched. Effects on humans were minimal, mainly being limited to fright, 'car following', often for several miles and, occasionally, interference with vehicle electronics. Taking all the currently reports held (~30 years), there is insufficient data to carry out a statistical analysis on human effects.

WITNESS GENDER & AGE.

67. A very small proportion of witness reports involve children, usually aged ~8-15. Sometimes adults have been alerted by children, leading to a multiple witness event. In a sample of 850 reports although 64% were submitted by men (who are more likely to walk outdoors in the evening and night by themselves), many hundreds of reports were correlated and confirmed by multiple witnesses of both genders, located at the same place and time, and often accompanied by the civil police, called to the scene. The viewing and reporting of UAP is therefore not a function of gender or age. However, as pointed out at Volume 2, Working Paper No 25, certain types of person may be more susceptible to the apparent fields which emanate from some UAP. These fields are only effective when the recipient of the energy approaches the source to a short distance and enters what appears to be the source 'near field', using the terms of conventional field theory.

WITNESS LOCATION

68. While using individual circumstances to enable the filtering of the most obvious misreports (reflections through glass, etc.), no consistent occasions have been found which have caused obvious misreporting due to the location of the observers, causing, for example, optical errors. The incidence of these is small. Valid reports are received from witnesses from all walks of life and in diverse locations, and few, if any can be attributed to an aberration caused by the location. For example, a phenomenon initially viewed through a car or building window is usually still present when the window is opened or the observer goes outdoors for a better view. The number of optical aberrations causing misreporting are probably very small for surface-based observers and more likely from aircraft, where curved and sandwich windows, rather than flat glass/perspex is used, the duration and field of view is often limited, and for obvious reasons the windows cannot usually be opened. Few observers are up in the mountains at night so there are few opportunities to obtain a view of a UAP from above, from a stationary position, although, (see Volume 2 Working Paper No 13), other unfamiliar, atmospherically-produced phenomena can occasionally be seen.(U)

STATISTICAL CONCLUSIONS

69. The key conclusions are based only on analysis of the available data. No attempt is made here to apply the popular conclusions which the public reach, following a set of UAP behaviour. The key to the enigma of the hitherto unsolved proportion of UAP reports is undoubtedly the proven link with meteor activity and the UAP reports which coincidentally follow if the conditions pertain:

- It is clearly of no consequence as to whether a human is present or not. There have never been any reports that a human has attracted a UAP, however a vehicle may do so. This is attributed to its possible net field charge.

- **UAP can climb as well as fly level or dive, do so more than once and do so rapidly and repeatedly.** This is believed to be caused by a change in buoyancy or charge, or in both. Sometimes this phenomenon occurs after more than one UAP have merged together, or, it is believed, new UAP magnetic or electrical charge or temperature conditions have occurred.

- **The merging of UAP together is frequently reported - but for this to occur they are always in fairly close formation to start with.**

- **There are isolated occasions when UAP in motion close together diverge.** It is believed that this occurs when the attraction between them becomes weak and one or other is attracted away by a stronger field.

- **The charged nature of UAP appears to result in forces which enable motion to take place in a direction against the wind.**

- **Some UAP have been reported emanating a beam or beams of light. Either these have a finite internal source of energy at optical wavelengths or continuously change or retain some form of energy which is emitted as visible light. The only reasonable alternatives are that the UAP emanation comprises charged particles, which either themselves emit light (luminescent) or they reflect ambient light from their particles, viewed in a similar manner to a sunbeam. If charged particles are involved then the presumed discharge path rapidly starts to affect the life and physical nature and position of the plasma. These conclusions are made because observations of this phenomenon is often described as a 'beam' or 'beams' and is often downwards, after which the body invariably changes its charateristics or motion or even disappears altogether.**

- There are a limited number of occasions when an apparently solid object is reported in daylight often as a silhouette. This is believed, when a plasma is involved, to be due to total internal reflection. Descriptive shapes, such as triangles, are usually accompanied by a 'light'. This, from the evidence, appears sometimes as what seems to comprise several separate gaseous plasmas, often brilliant in intensity and colour in a loose aerial formation. The outlying plasmas at each extremity are used by the observer to describe the overall shape. The shape described is dependent on the position of the observer. It is noted that aspect plays an important part in shape description. A formation of plasma balls forming a 'triangle' or a 'diamond' when viewed in plan, takes the form of a 'cigar' when viewed side-on. The presence of bright spots in a plasma formation can easily be described as a row of lit 'portholes'.

- Sound is a very rare event from a UAP, indicating that air is not being thrust, as in a normal propulsion mode. This is generally reported as 'electrical', humming, 'whining' or 'crackling'.

- Smell is similarly a rare event and again is described as 'electrical.'

- Because light is the primary mode of observation the statistics show 64% are seen in darkness and 10% in dusk conditions.

- UAP reports can originate from single or multiple sightings at the same location. Because, **once formed, UAP can travel at all altitudes, sometimes at high speeds for their duration**, the same object or objects can be seen by observers at large geographical separations.

- **UAP life can vary from seconds to, exceptionally, tens of minutes.** If the UAP is a plasma its life is limited and it probably starts to disperse from the moment it finds a discharge path. At this point its life either ends abruptly, or its internal characteristics change (a probable change in charge and buoyancy). These usually cause it to move. It may have sensed a more attractive electrical or magnetic field.

- **It has been shown that more than one UAP event can be present in UK airspace on the same day and at the same time at widely spaced locations. There is no indication that these have initially diverged or subsequently have merged. Those that diverge or merge appear as a group within the same location over a limited volume of airspace, usually a few hundred metres in diameter.**

- **UAP reports are not evenly spread from day to day.** The daily sighting reports vary between zero and up to several tens per day. There is no doubt that 99% of these are genuine reports irrespective of whether they are from trained or untrained members of the public.

- The UAP peak in February was unexpected - as during cold winter nights fewer reports would be expected as fewer observers are outdoors. Clearly, despite fewer observers, more reports are generated, because more UAP are apparently present.

- **UAP events, plotted as date and frequency, have been shown beyond doubt to be statistically-correlated to the dates and densities of meteor activity on the assumption that the proportion of meteors entering the Earth's atmosphere are sensibly distributed across the UKADR .**

- Apart from aircraft passenger reports (very rare), few, if any, public reports could be rejected due to the credibility of location (e.g. distortion and misunderstandings

produced by viewing through glass). After initial contact those indoors usually obtained a direct sight line by going outdoors or opening windows.

- **Repeat UAP sightings at different times and dates through the year which have occurred at the same location cannot be shown to have any relevance to the location.** However, it is suspected that the likelihood of UAP may be enhanced by certain locations where electrically-charged plasmas would be expected to be attracted. For example, towards aircraft and aircraft environments such as airfields and air corridors, electrical pylons, electrical rail-lines, charged dust particles in industry or over towns. There is no evidence to suggest that UAP favour militarily strategic locations.

- While a proportion of the large numbers of reports received in the vicinity of airports, military airfields and air corridors are due to misreports of aircraft, most of **the public who live in these areas are quite capable of discerning the difference between something which is a part of their daily lives and something which has characteristics out of the ordinary.**

- Relatively few reports are received from Wales, Scotland, the IOW, NI, IOM and the Outer Isles and from ships in UK waters and from aircraft crews, compared with land-based observers in England. This fact is attributed to a combination of the many factors which must affect aerial observation, including population distribution, airports and air corridor densities, work patterns in the big cities and terrain.

- Lightning can be present for some two hours after a storm and also present when a storm has taken place elsewhere. **Ball lightning, which is a plasma form, and which has been replicated in the laboratory, accounts for a number of UAP sightings.**

- Statistical investigations, using weather data, have shown that **UAP can occur when there is no thunder present anywhere in the UKADR**. Hence the conclusion can be drawn that some events reported as UAP (after filtering out known mis-reports of aircraft, satellites etc.) must be due to other causes.

- Statistical analysis of UAP colour has shown that, either by day or night, the UAP is reported as having a 'light' or 'lights'. One third of all sightings reported more than one (and as many as eight) white light(s).

- On the majority of occasions a single light was reported as a 'round' object, even when the observer could only see the light and not the actual shape if there was one.

- On about 7% of occasions UAP were perceived as 'solid' objects. [Working papers at Volume 2 describe the physics of how it is believed this can occur].

- **There is no statistical evidence to show that UAP form at any particular time of day.** It is believed that UAP which cannot be explained as man made or by other less well known atmospheric activity are spread more or less randomly in time and date and caused partially by lightning but mainly by meteor activity. It is inevitable that more will be reported when the eye is attracted in dusk or darkness, especially if unusual motion is taking place.

- About 14% were reported as 'spinning', 1.6% as 'pulsating' and 'bobbing' or 'erratic'. Usually reports are made because this is an unfamiliar motion of lights in the sky. It is believed that a body of gases which may have varying internal processes taking place, including effects which vary buoyancy and electrical charge may exhibit such motion.

- **Positive (+0.62) correlation was shown between thunder (lightning present) and the presence of UAP reports.** This was taken as a whole over the country. No attempt was made to link UAP locations with thunder locations from the reporting meteorological stations. However, the opposite (UAP present **without lightning present),** was also confirmed; as is the case that **even with thunder present there were many days when the lightning did not produce UAP reports.**

- **No correlation of UAP reports was found with Solar Flux or Sunspot number.**

- Although 64% of reports were forwarded by men, the statistics showed that UAP could be observed by either gender and by children (who frequently called adult attention to unfamiliar sights).

- Over the period 1987-1996 the number of days per year on which there were **no reports** of UAP has been **significantly decreasing** (from 280 down to 130).

	1987	1988	1989	1990	Mean
ENGLAND [1]	109(87%)	319(89%)	200(89%)	102(83%)	87%
SCOTLAND	6(4%)	23(6%)	11(5%)	12(10%)	6%
WALES	10(8%)	15(4%)	13(6%)	3(7%)	6%

TABLE 3-1 PERCENTAGE OF REPORTS BY NATION

Note: The number of sightings from Northern Ireland, The Isle of Man, the Outer Scottish Isles and The Isle of Wight are negligible and are included in the appropriate mainland totals.

	1987	1988	1989	1990	Mean(%)
DAWN	3	25	18	10	7
DAYLIGHT	18	87	42	12	21
DUSK	22	39	20	4	11
DARKNESS	88	211	192	40	60

TABLE 3-2 EXAMPLE BREAKDOWN OF TIME OF DAY OF REPORTS

Year	Jn	Fb	Mr	Ap	My	Jn	Jl	Au	Sp	Oc	Nv	De	Rounded Total
1987	2	7	6	5	6	1	8	26	16	16	19	19	120(150)
1988	41	48	38	21	24	28	17	28	30	31	28	32	365(397)
1989	17	12	14	7	9	9	26	21	28	32	39	11	225(258)
1990	15	11	7	-	-	-	-	-	10	24	8	15	90
1991	10	9	3	2	4	5	14	7	10	13	5	4	85(117)
1992	7	18	2	-	-	-	-	8	1	11	-	5	147
1993	1	-	1	-	2	4	3	9					(258)
1994*													(250)
1995	40	16	28	10	22	27	21	29	22	36	33	20	284
1996	19	71	38	42	44	24	79	80	53	52	55	35	595
1997	35	28	32										95*

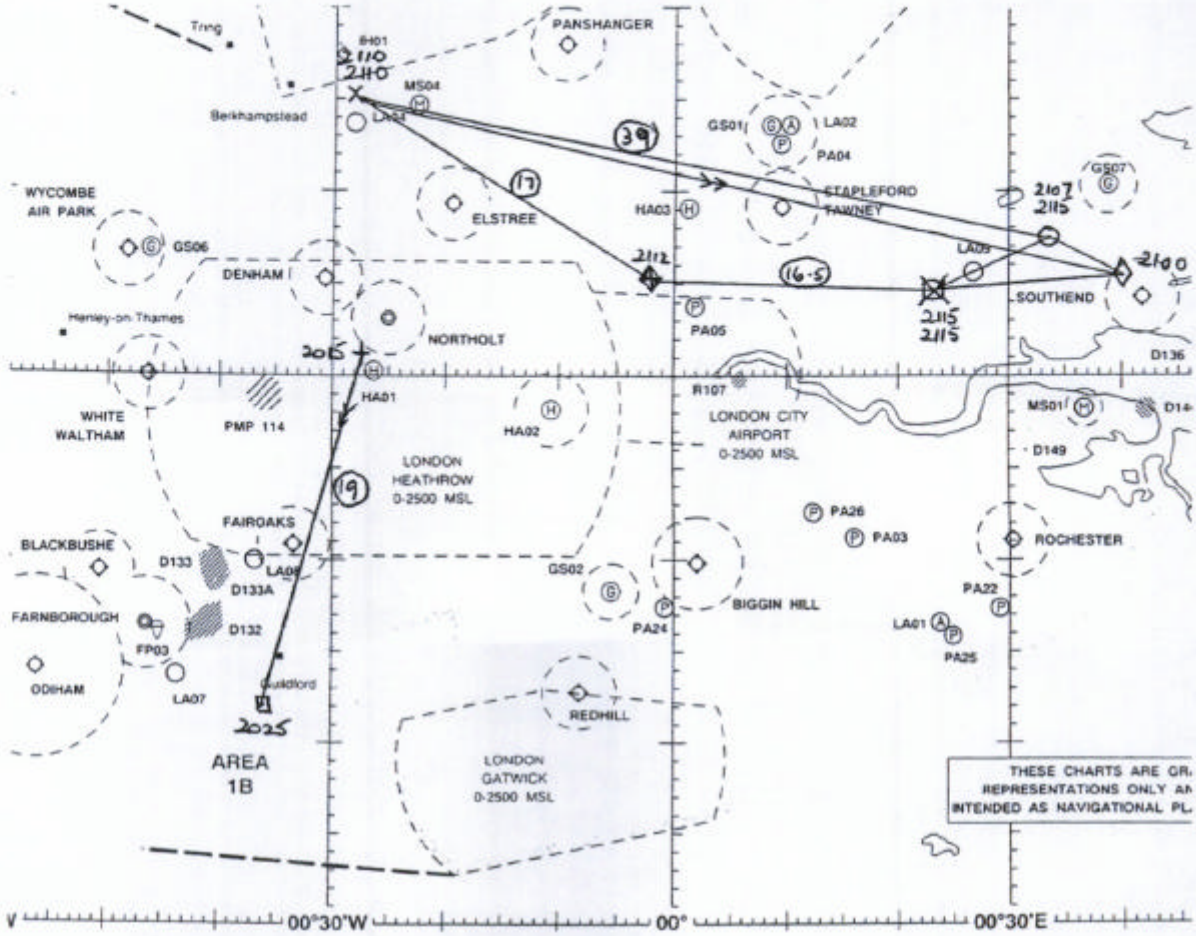
Notes: *Report details incomplete. 1995 figures for first 3 months only.

Bracketed figures show some differences in overall totals due to inaccurate report counts, pre1994.

TABLE 3-3 NUMBERS OF EVENTS PER MONTH OVER 10 YEARS (U)

Year	Jn	Fb	Mr	Ap	My	Jn	Jl	Au	Sp	Oc	Nv	De	Monthy Average	Rounded Totals
1987	29	21	25	26	26	29	24	15	21	20	21	22	21	280
1988	12	8	11	18	17	17	19	15	13	17	15	22	15	180
1989	16	18	21	24	23	23	16	19	11	12	12	23	18	220
1995	13	16	15	24	18	17	20	13	15	14	12	18	15	185
1996	19	8	15	9	9	19	7	6	4	10	10	16	13	130
Mean	18	14	17	20	18	21	17	13	13	14	14	20	16	

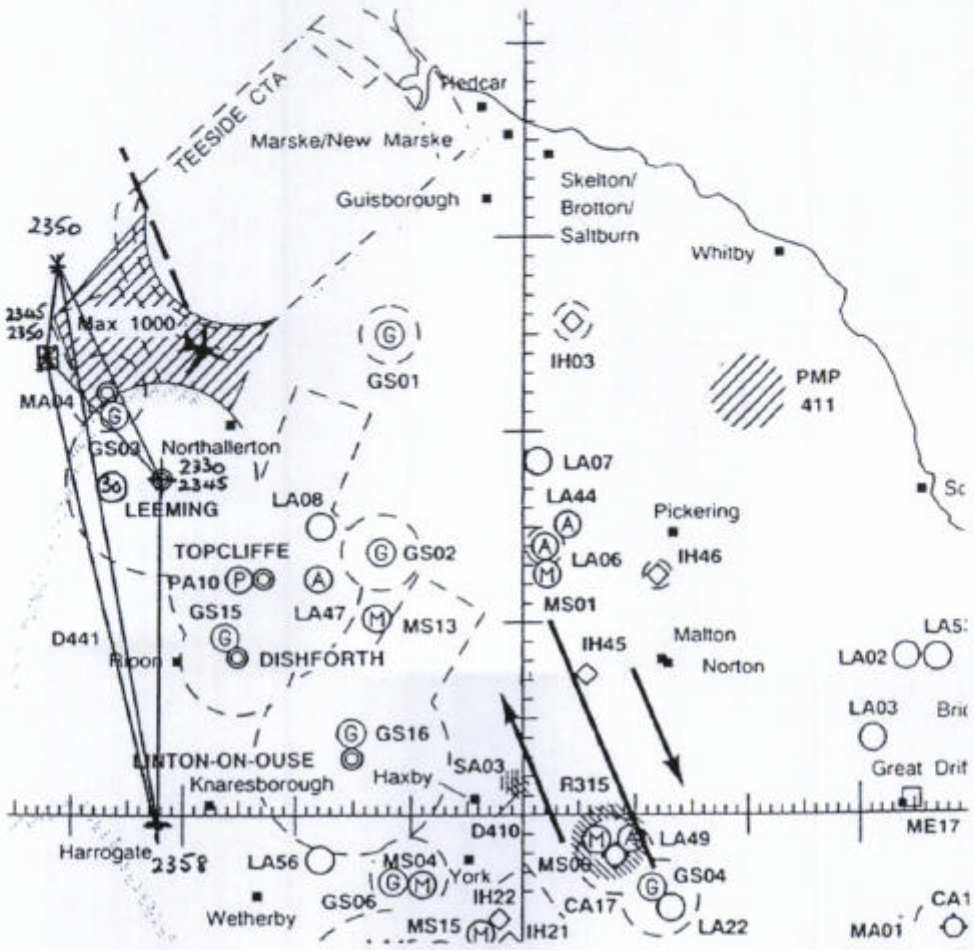
TABLE 3-4 NUMBERS OF DAYS PER YEAR WITH NO SIGHTINGS REPORTED FOR 5 YEARS BETWEEN 1987-1996 (U)



Notes: The tracks could represent one or several UAP. After leaving Godalming(S of Guildford) the UAP may have remained unreported an re-emerged in the Southend area and towards Danbury for 7 minutes. A track appears to start N of London at 2110, where it was seen twice (or there may have been two objects) and proceeded roughly SSW towards Danbury. Alternatively, the 2115 hrs Danbury event may have been a second sighting of the 2107 event, as may have beeen one or both of the Brentwood events. Danbury is on a hill. only on exceptionally clear conditionswould it be possible to see an event at Danbury from Brentwood or vice versa. However, an observer at both places would be jointly able to see a target midway between these locations. A time error in the Rochford report would result in the complete (double arrow) track sequence from Hemel Hempstead to Rochford.

FIGURE 3-1 PLOT OF UAP ASSESSED TRACK

(Date: 18 June 1988)



NOTES: An approximate 60nm per degree has been assumed for plotting purposes at this latitude. The most Northerly observation point is Scotch Corner, with Richmond to the SSW. It is not known whether the object described a zig-zag, curved or straight southerly path.

FIGURE 3-2 PLOT OF ASSESSED UAP TRACK

(Date: 20 December 1988)

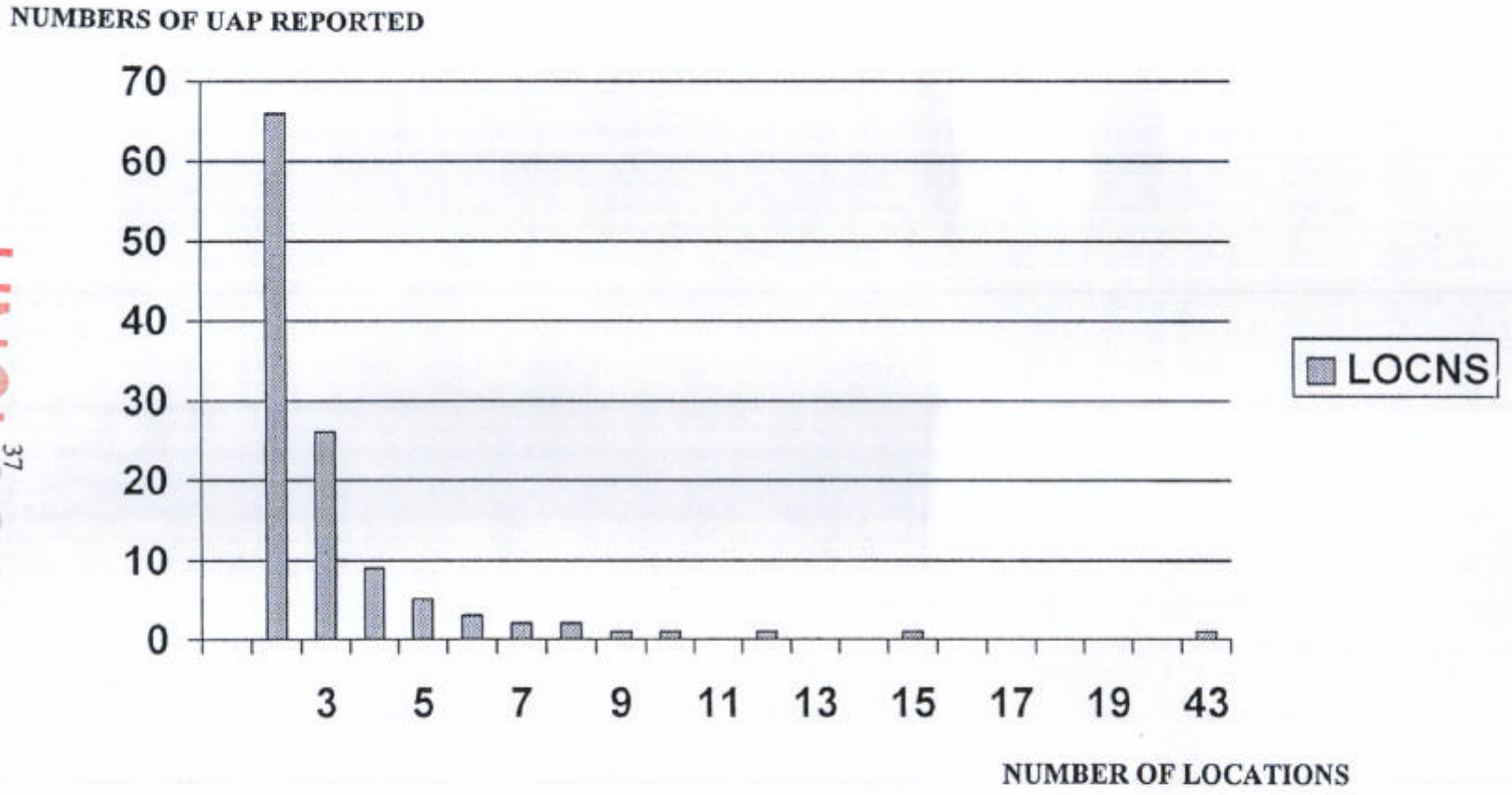


FIGURE 3-3 FREQUENCY OF REPEAT SIGHTINGS AT SAME LOCATION FOR PERIOD 1987-1991(U)

RED 1987-91

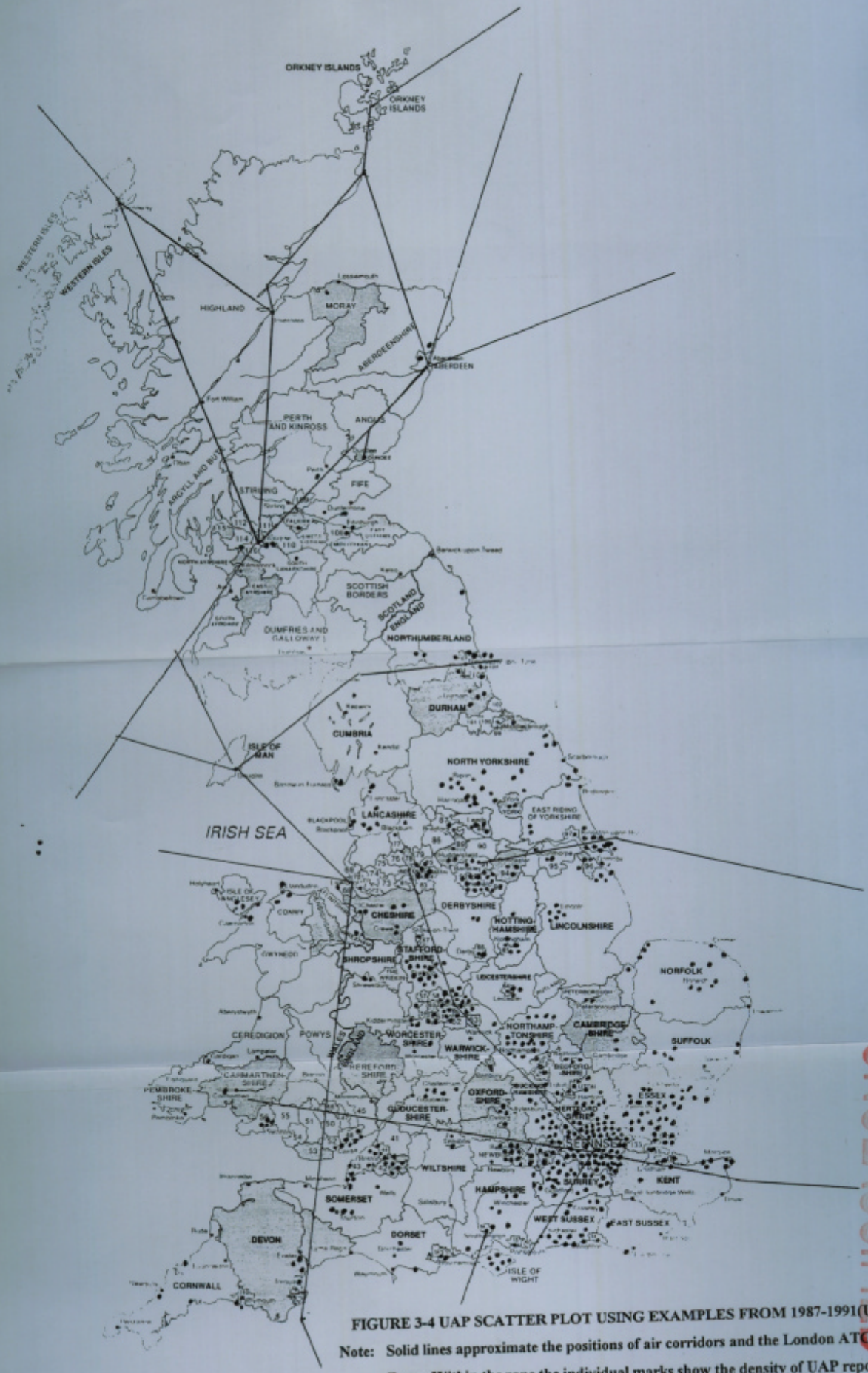


FIGURE 3-4 UAP SCATTER PLOT USING EXAMPLES FROM 1987-1991(U)

Note: Solid lines approximate the positions of air corridors and the London ATC. Zone. Within the zone the individual marks show the density of UAP reports They are, for reasons of clarity, not all in precise positions

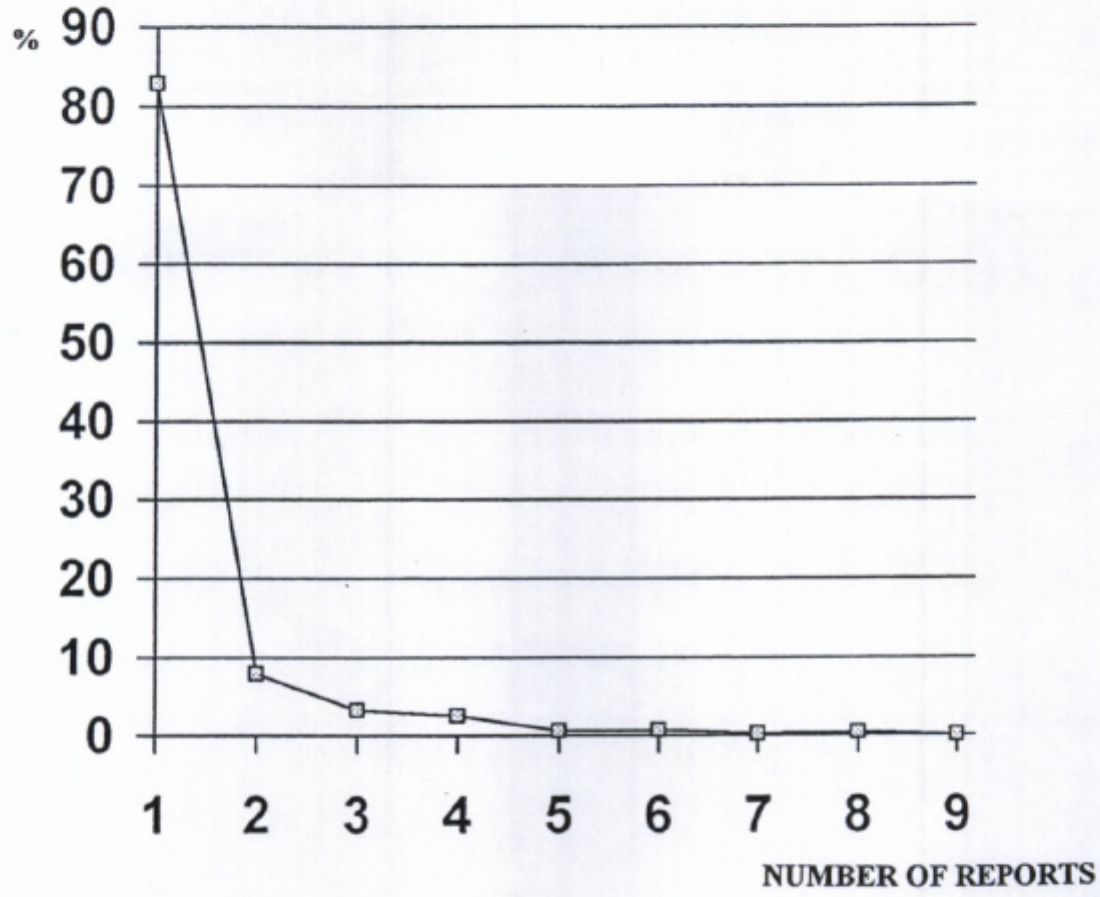


FIGURE 3-5 NUMBERS OF UAP SEEN IN EACH EVENT(U)

(Date: 1987-1991)

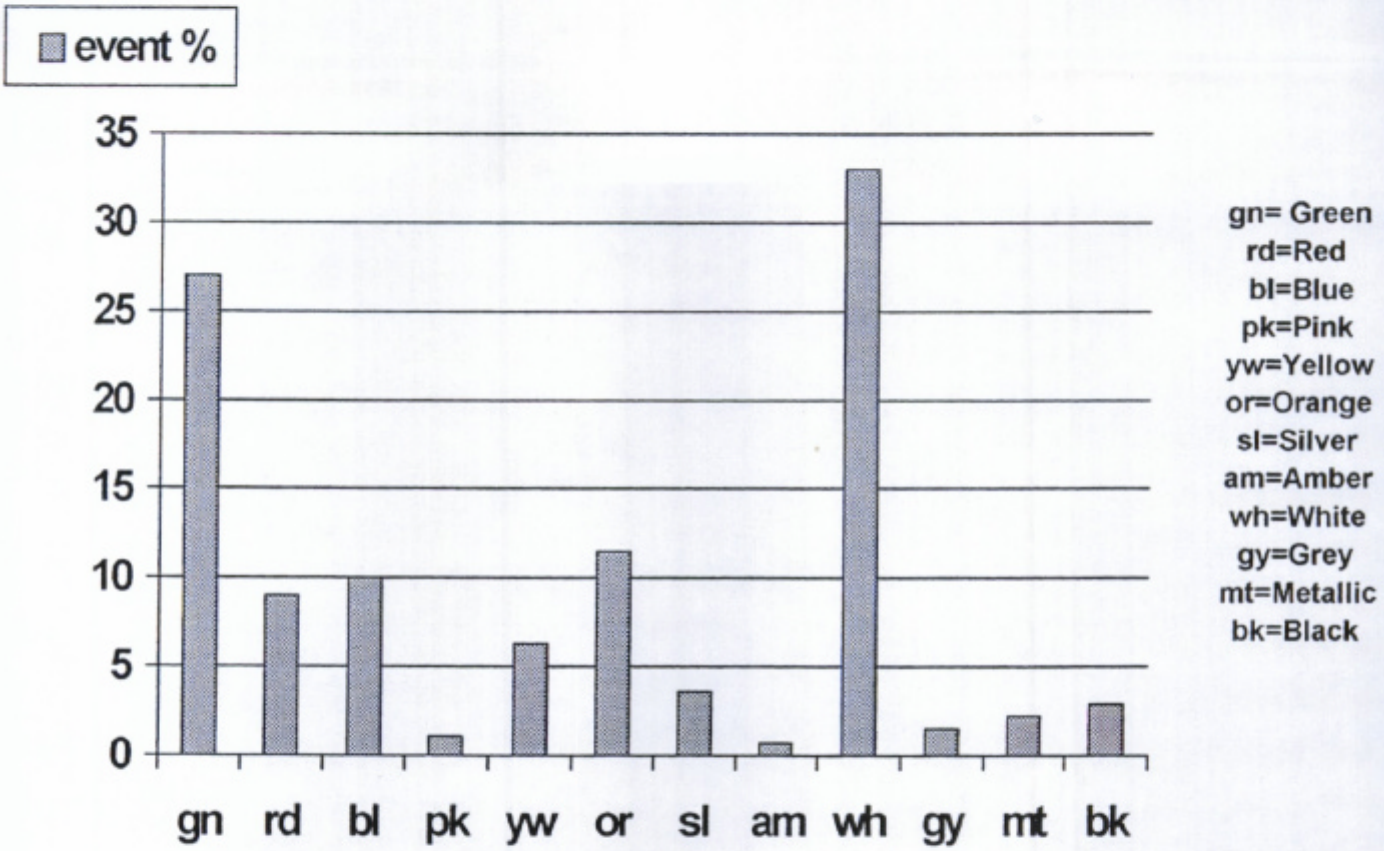


FIGURE 3-6 ANALYSIS OF UAP COLOURS(U)

(Dates: 1996/1997)

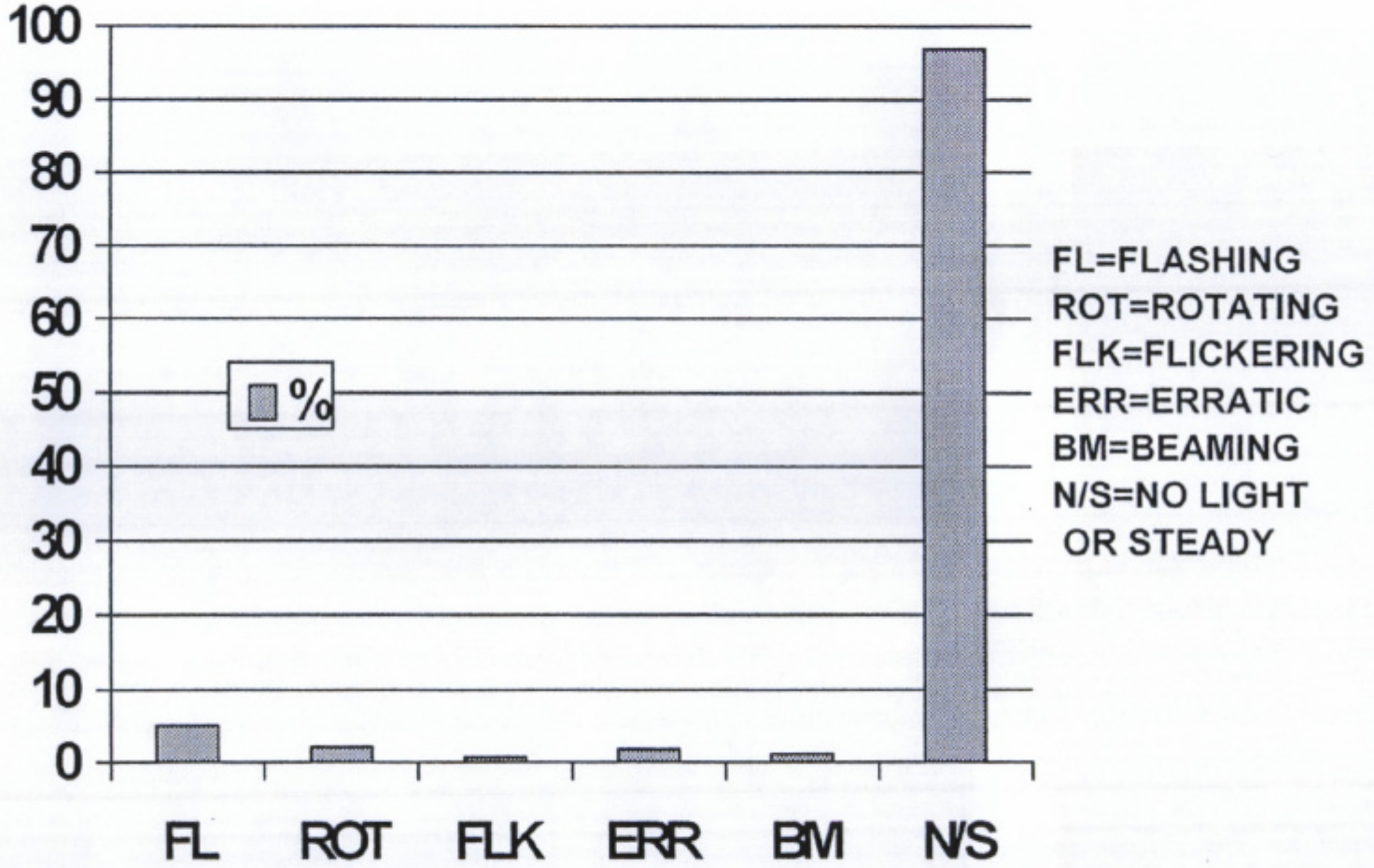


FIGURE 3-7 ANALYSIS OF UAP LIGHT ACTIVITY (U)

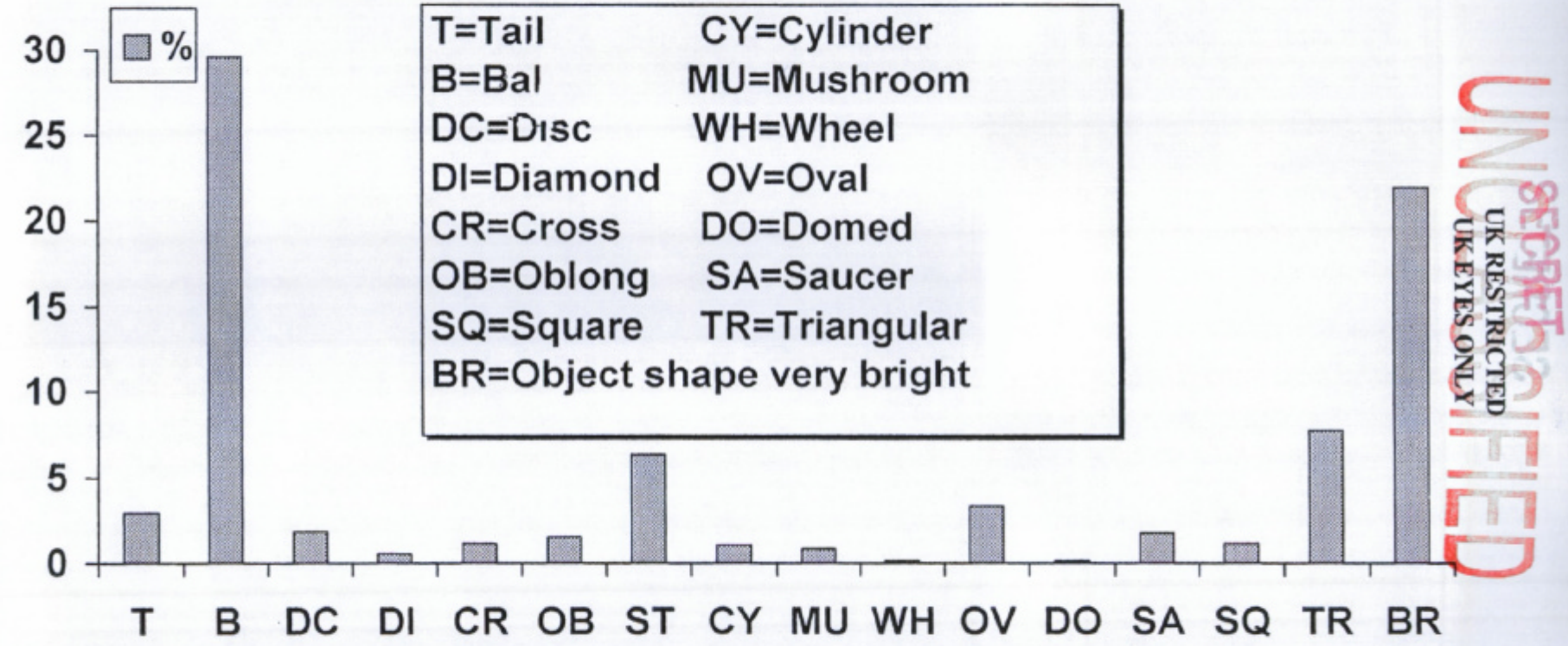


FIGURE 3-8 ANALYSIS OF UAP SHAPES(U)

(Dates: 1996/1997)

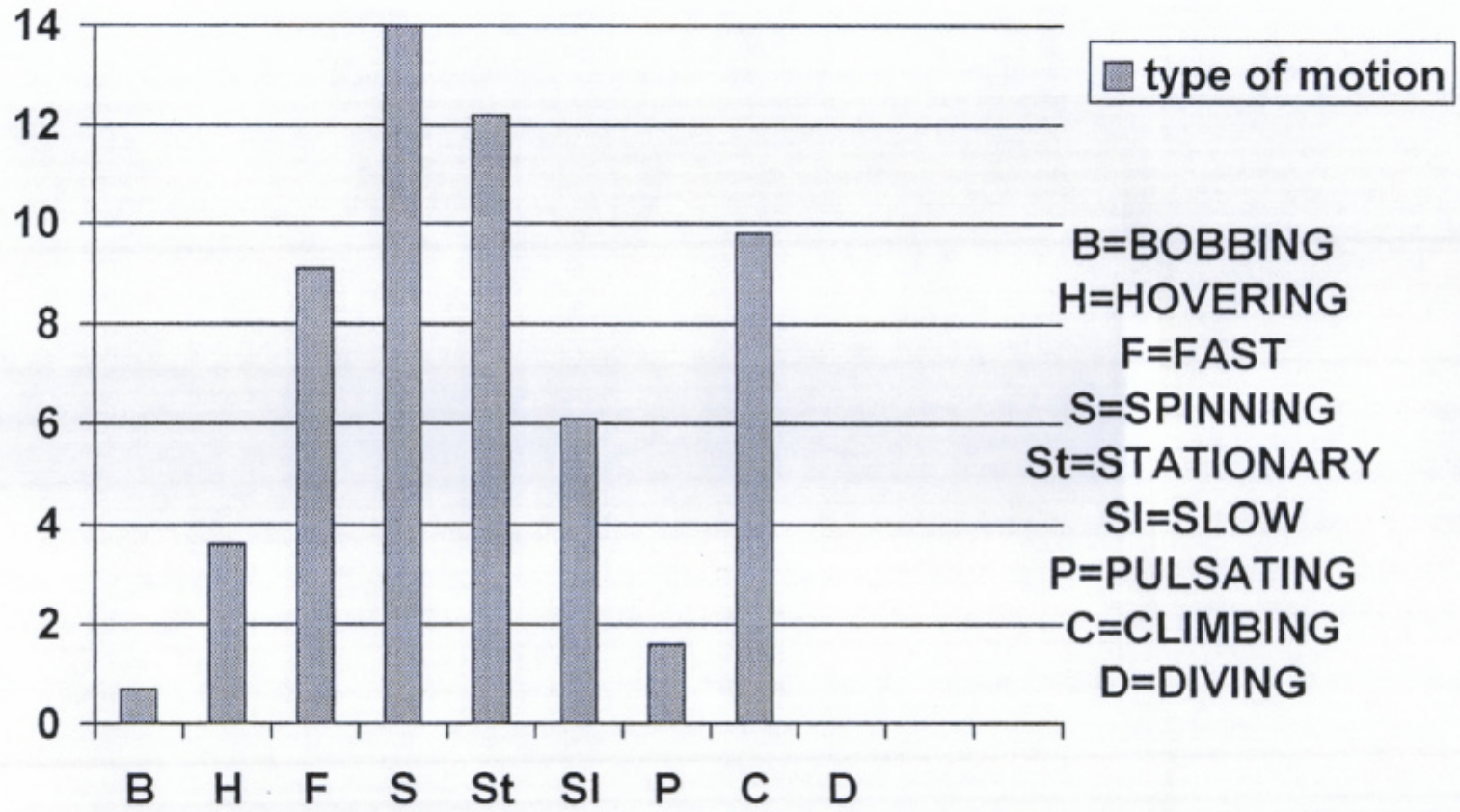


FIGURE 3-9 ANALYSIS OF UAP MOTION (U)

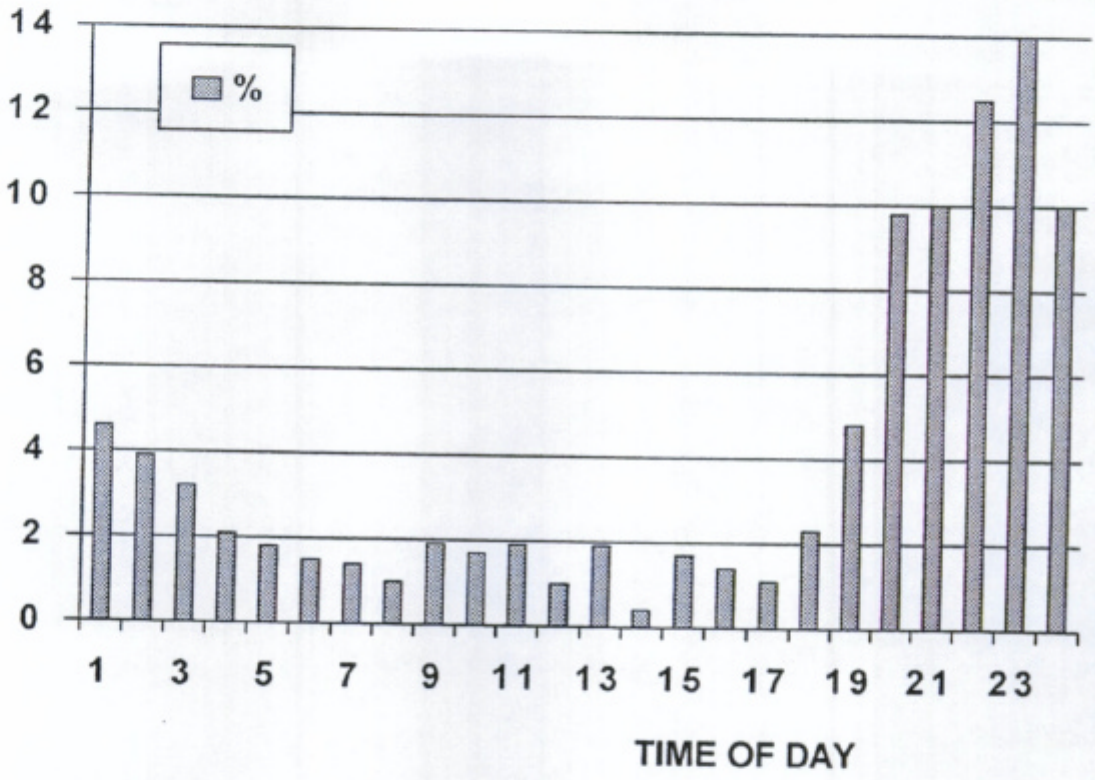


FIGURE 3-10 CORRELATION OF UAP ACTIVITY WITH TIME OF DAY(U)

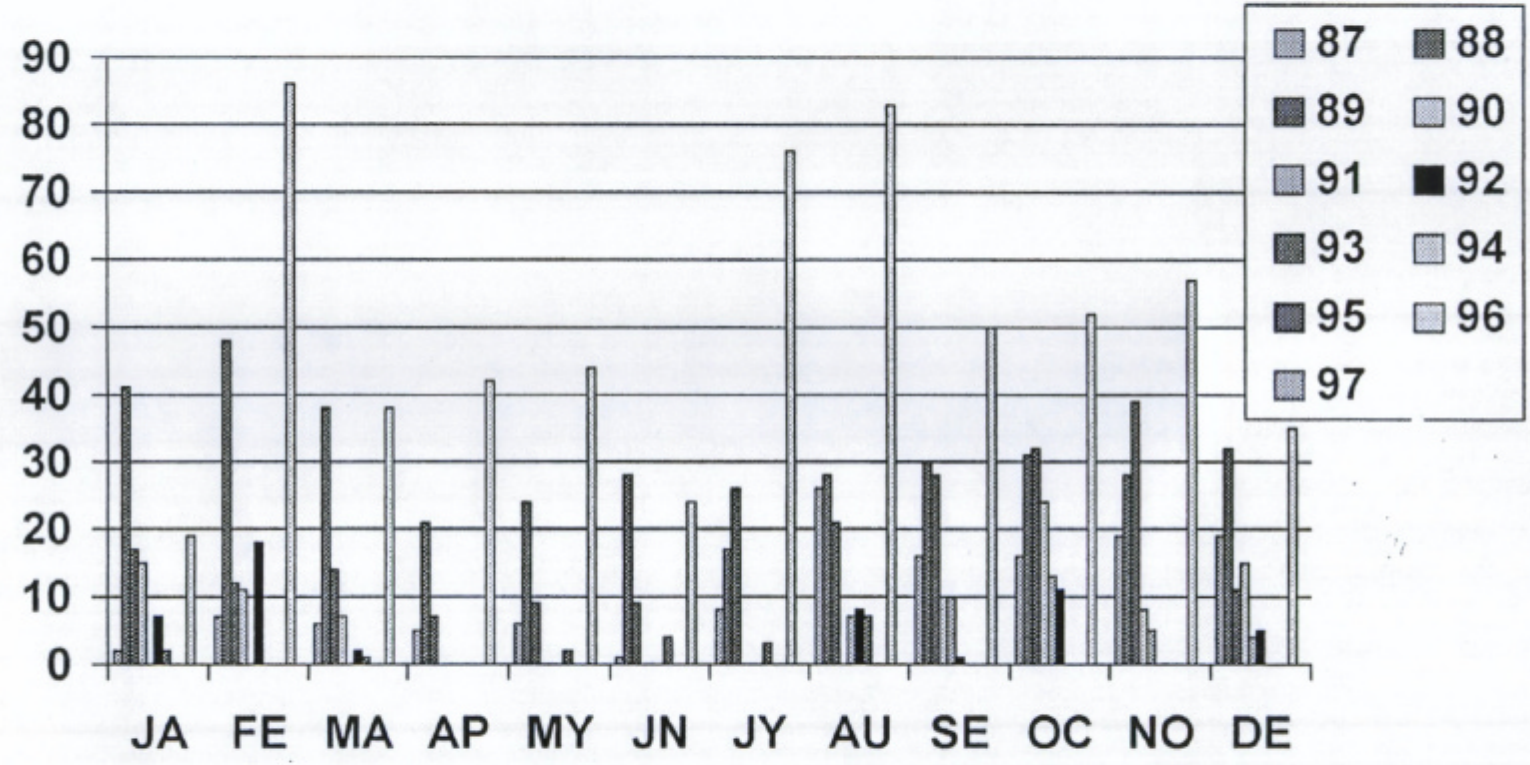


FIGURE 3-11 CORRELATION WITH MONTH OF YEAR(U)

(Events in period 1987-1993 & 1996-1997)

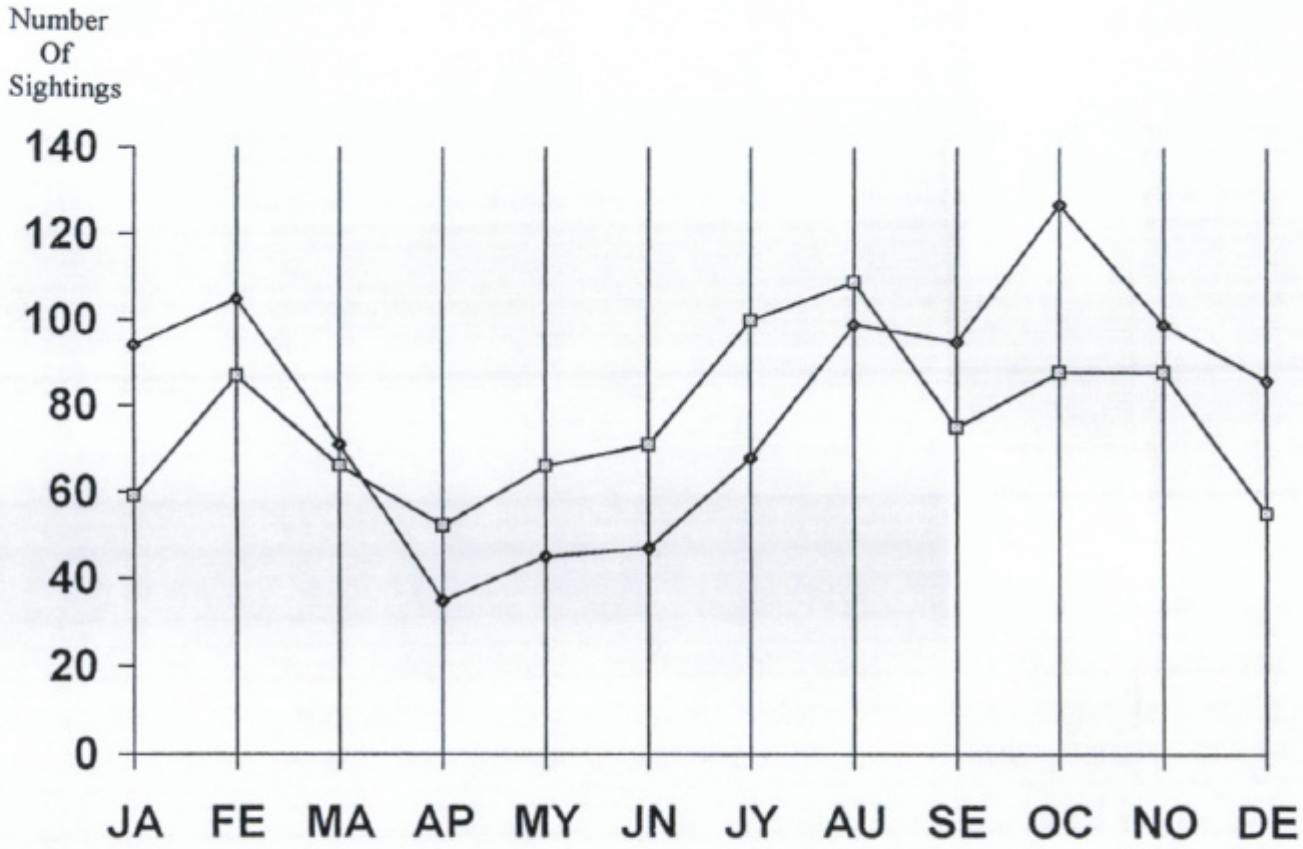


FIGURE 3-12 COMPARISON OF ANNUAL MONTHLY SIGHTING TRENDS(U)

(Events in Period 1987-93 with period 1996-97)

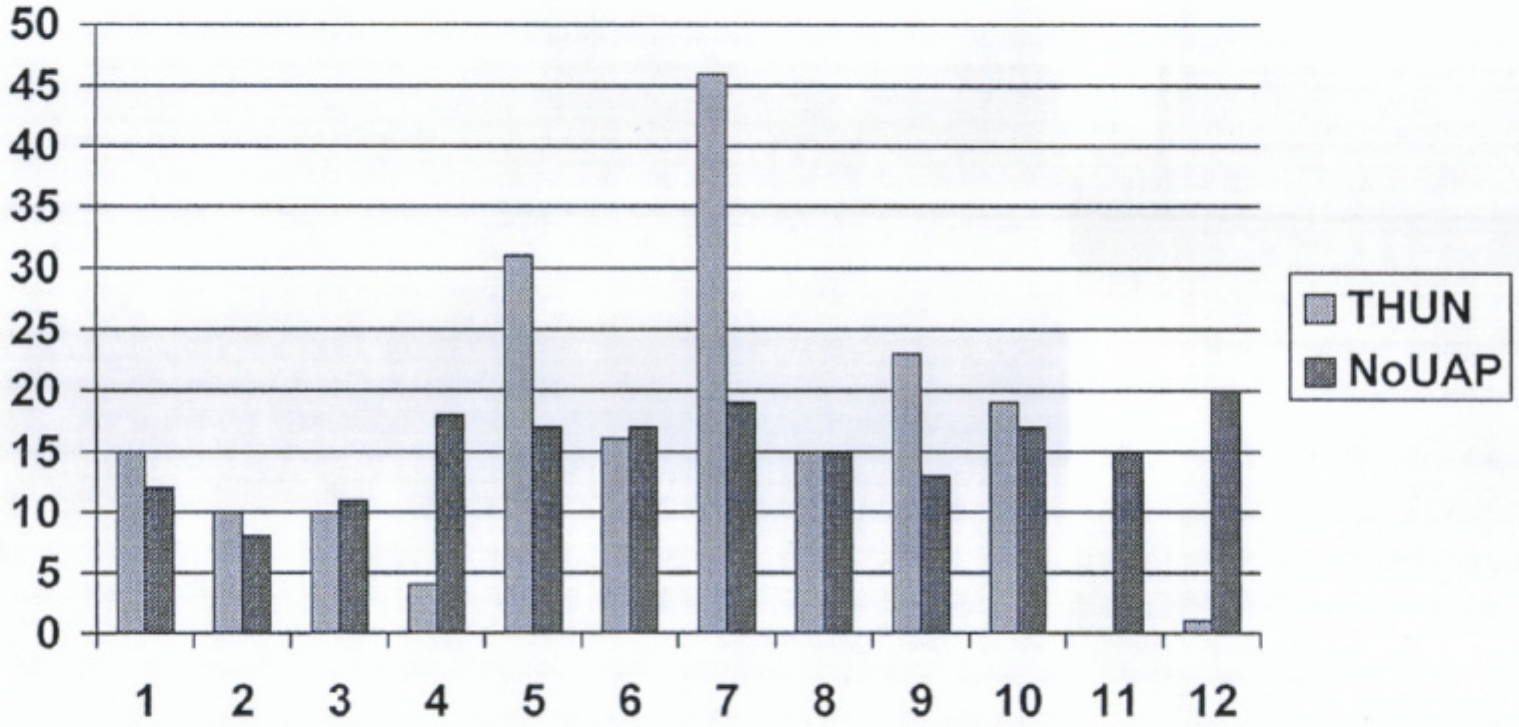


FIGURE 3-13 DAYS OF ELECTRICAL ACTIVITY COMPARED WITH DAYS WITH ZERO UAP REPORTS (U)

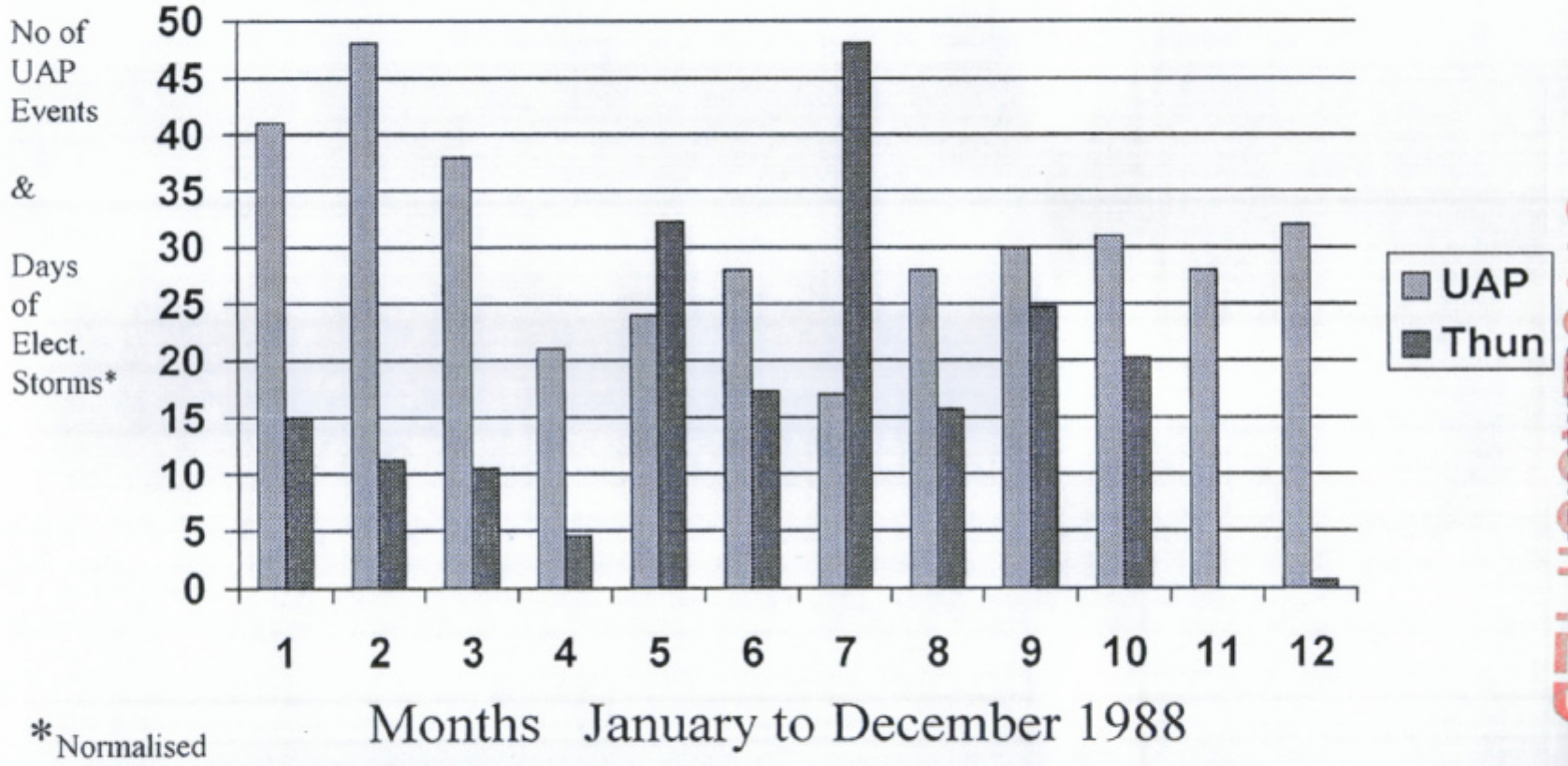


FIGURE 3-14 DAYS OF ELECTRICAL ACTIVITY COMPARED WITH DAYS WHEN UAP REPORTS OCURRED IN 1988(U)

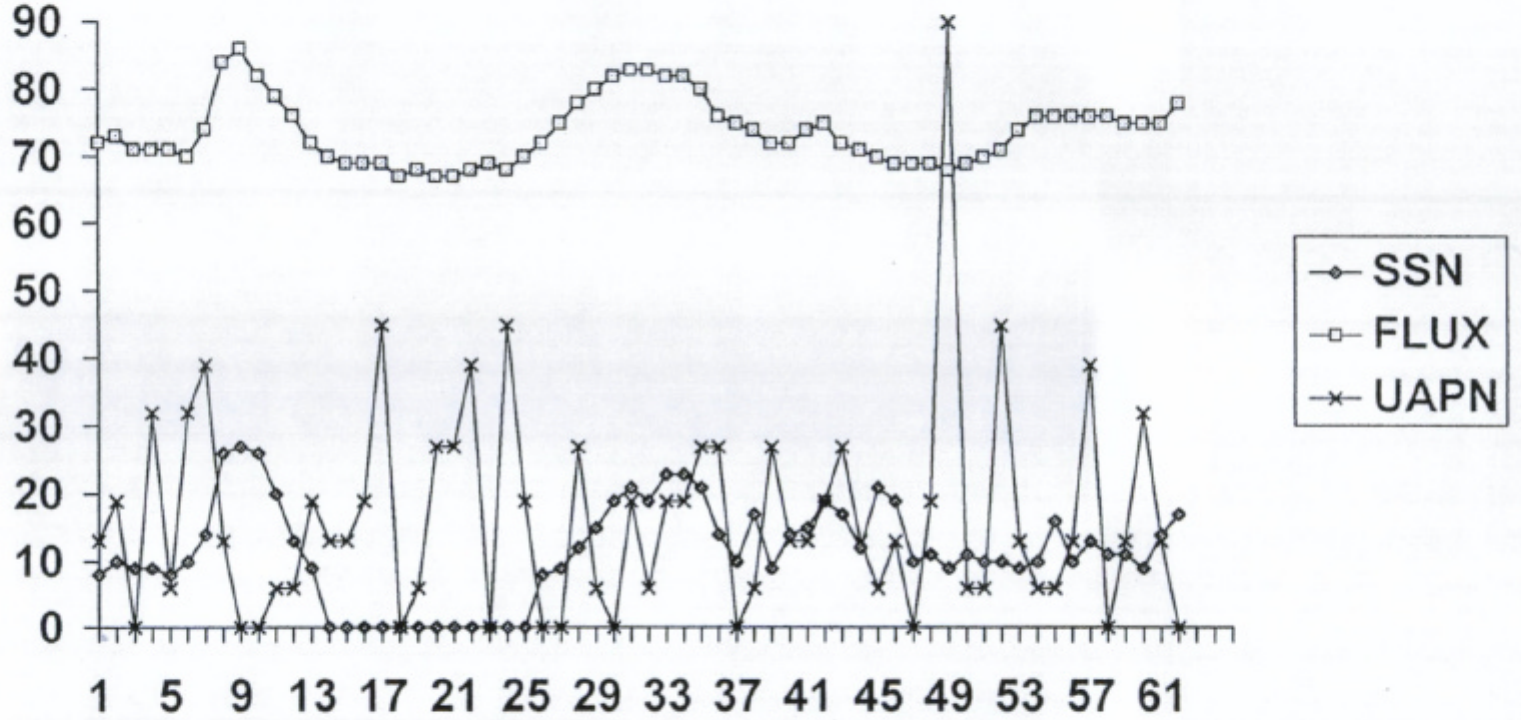


FIGURE 3-15(a) UAP EVENTS V SOLAR EFFECTS(U)

(SUNSPOT NUMBER & SOLAR FLUX JULY/AUGUST 1996)

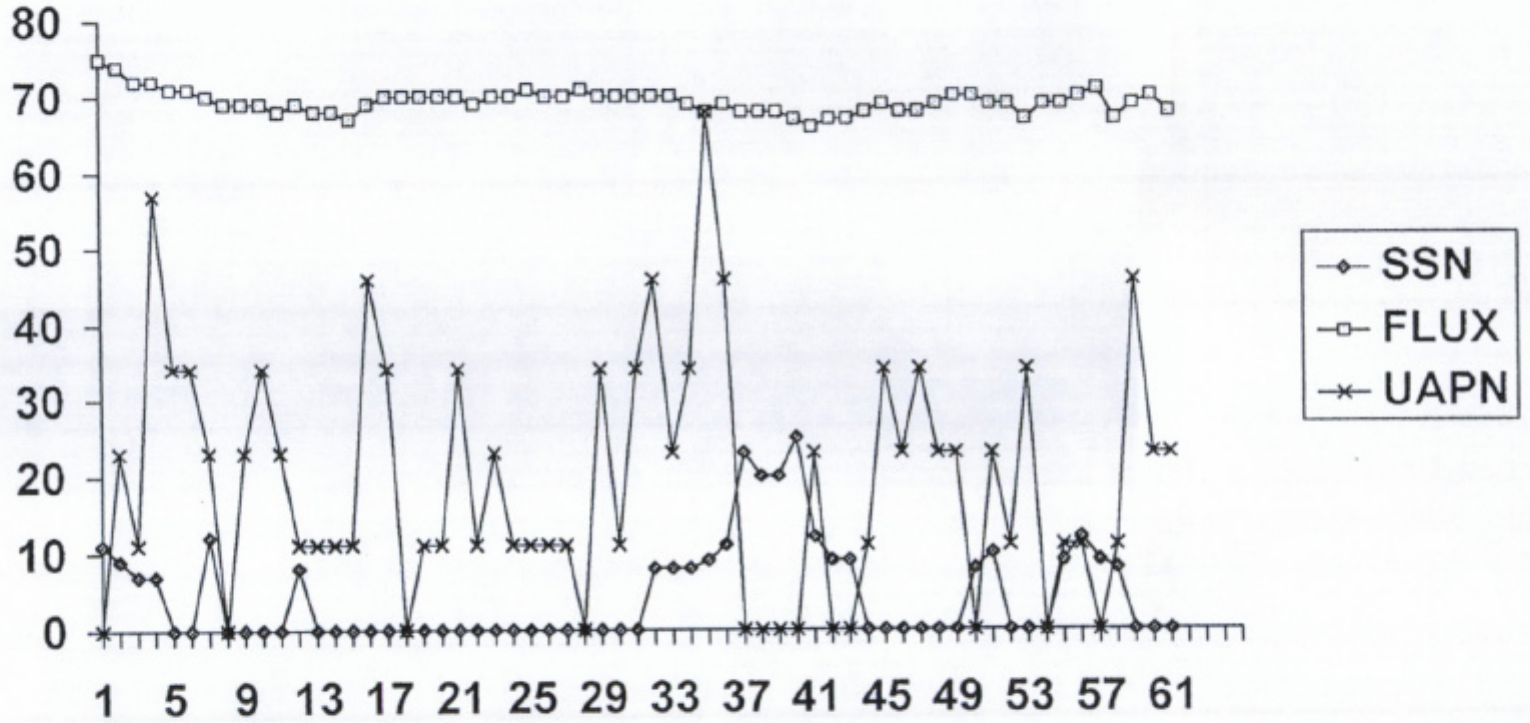


FIGURE 3-16(b) UAP EVENTS V SOLAR EFFECTS

(SUN SPOT NUMBER & SOLAR FLUX MAY/JUNE 1996(U)

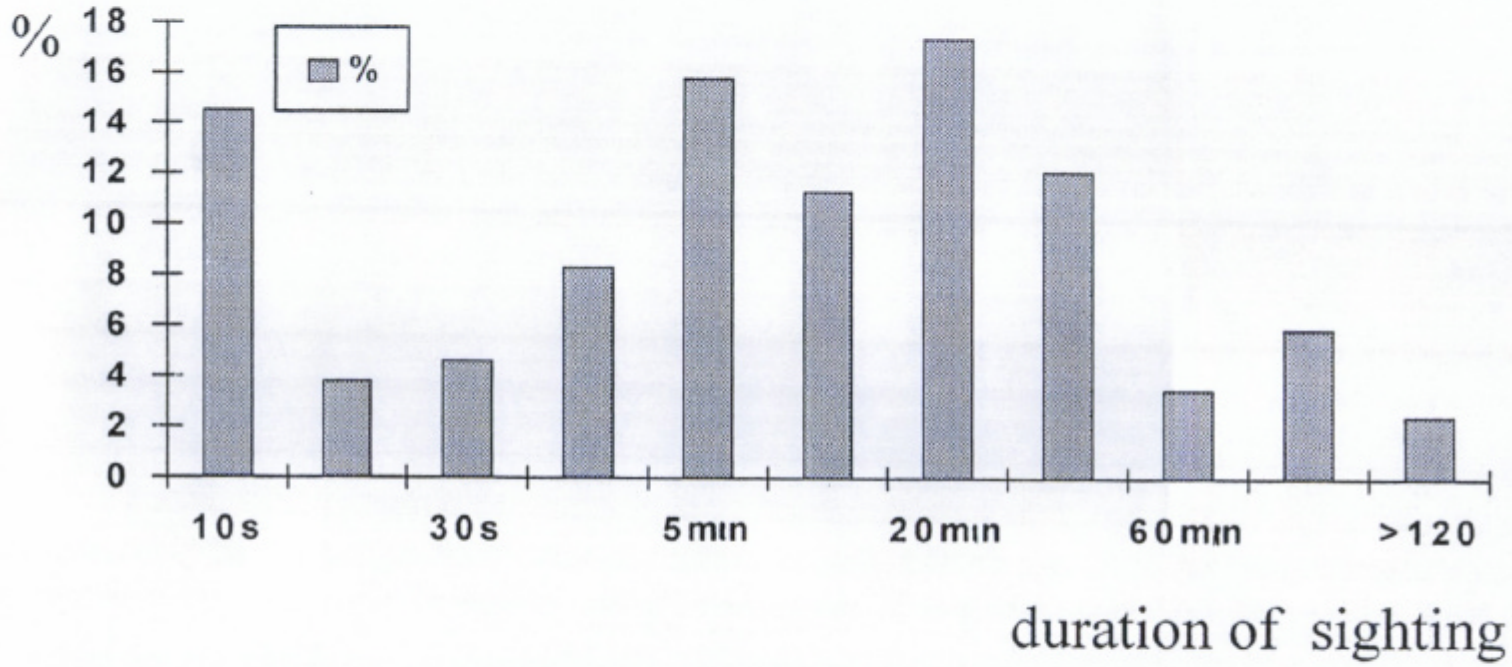


FIGURE 3-16 UAP EVENT DURATION 1996-1997

Meteoroid: Physical body (rock) in space before it enters the Earth's atmosphere and creates the flash of light, known as a meteor.

Meteor: From the Greek, 'phenomenon in the sky' when a meteoroid enters the atmosphere at high speed and burns up.

Micrometeoroid: A small meteoroid, such as expected from the debris of a comet. Diameter 0.01-0.05millimeters.

Meteorite: Any piece of meteor which survives and hits the surface.

Asteroid: Pieces of rock or iron, which mostly orbit the sun between the orbits of Mars and Jupiter. The orbits are occasionally perturbed and cross the Earth's orbit, where they are the primary source for sporadic meteors and certainly the major source of meteorites.

Meteor Shower: All meteor showers have been associated with the encounter of the Earth with the debris cloud of a parent comet.

Meteor Storm: These occur about every decade. The most intense of which occurred last on November 17, 1966. The 'Leonids' shower appears always in November, with varying intensity and is only so-named because it appears to come from the direction of the constellation Leo. [The effect of the November Leonids can be clearly seen on the 1996 UAP-meteor correlation plot] The next intense meteor storm, following the recent passage of the comet responsible, is due in November 1998. The majority of the particles in the comet's trail are small and will not enter Earth's atmosphere, but even these, with the dramatic increase in hourly arrival rate can damage satellites.

FIGURE 3-17 Definitions for Meteoroid Events(U)

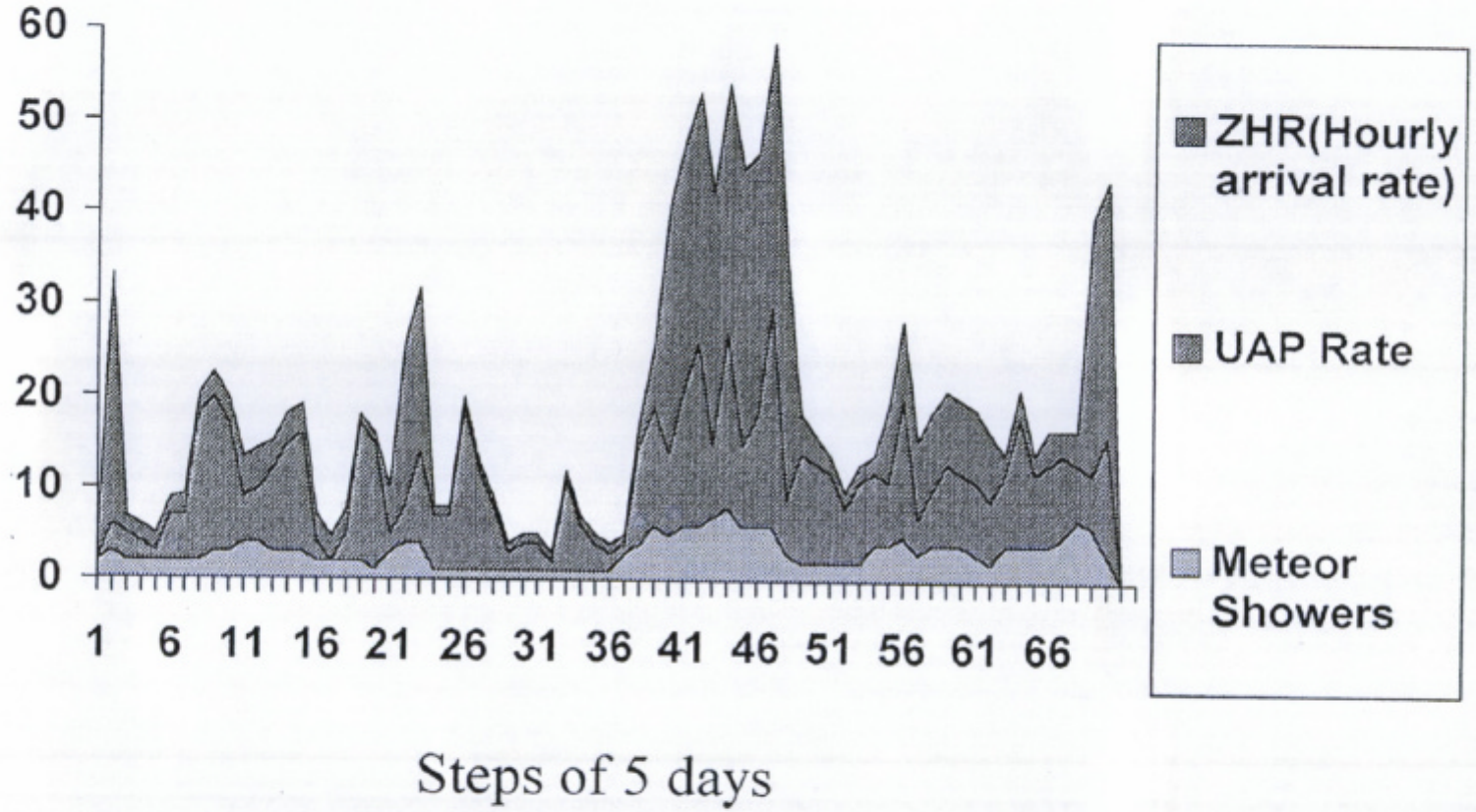


FIGURE 3-18 CORRELATION OF NUMBER OF METEOR SHOWER TYPES & METEOR ENTRY RATE (ZHR) WITH UAP REPORTS 1996(U)

CHAPTER 4

POTENTIAL RELATED MILITARY TECHNOLOGY

1. As a necessary adjunct to UAP database construction a large number of scientific papers were researched for any relevant information on atmospheric natural phenomena because of the distinct possibility of this being misinterpreted or misrepresented as UAPs. It was envisaged that, as the phenomenon can cause radar alarms and visual distraction that a deeper knowledge of the effect might reveal a possible military application that a hostile power, given the ability to reproduce the same effects might exploit, possibly as some sort of decoy or countermeasure. At the same time the possibility of man-made objects causing UAP events necessitated a brief survey (at Working Papers Nos 9, 14, 15 and 17) of the clearly possible mis-reporting of aircraft (black programmes or otherwise), satellites, balloons etc. The possibility of air-objects within earth's atmosphere with characteristics beyond or at the limits of the current technological capability of any of earth's aerospace industry having already been considered briefly at Chapter 2 and at Working Paper 6. A brief examination of whether the phenomenon could be replicated and whether or not any other nation was attempting to exploit the same or derivatives of the phenomena is reported at Volume 3.

DEDUCTIONS FROM WIDER RESEARCH

2. **Physical Observations & Human Factors.** Evidence, (measurements taken during Canadian medical investigation of False Memory Syndrome using modulated magnetic fields), has shown that creativity and the capacity to generate vivid images are correlated both with suggestibility and indices of elevated temporal lobe sensitivity. This human response has been briefly examined in the context of unusual human reactions when exposed at close ranges to UAP. It has been further discovered that if incidental/peripheral information is pre-absorbed, however sub-consciously, then this is heightened by unexpected additional influences. It is of importance therefore to note (and detailed at Working Paper No.25), that 20th Century apprehensions are to the fore. Hence, contemporary illusions of satanic cults, aliens, spacecraft, beam weapons, extra terrestrial 'examinations' and 'abductions' and the like; have replaced the old anxieties of fairy tales, spiritual abductions, ghosts, 'old hags', invasion by the Spanish or (in the USA in particular) by the Communists! It seems likely that the locations of tribal ceremonial sites (e.g. Stone Circles) were knowingly placed to enable humans to interact with 'earthlights' (See Working Paper No.10), so as to enhance mystical experiences. Later when satanic and other forms of rite were practised, Churches supplanted the old structures on these sites. Hence, many are currently located on 'Ley Lines', earth fault lines, (Working Paper No.10), which still produce earthlights, most probably due to seismic activity from time to time. Earthlights are illuminations produced at the point of earth movements.

3. The attraction of Earthlight sites in the first place was the medieval propensity to use them as indicators of buried minerals, such as iron, gold, zirconium and copper. However, there are no measurements of fields available to investigate possible correlation and to discover whether these are the same type of field(s) which cause the human experiences listed at Working Paper No 25. Earthlight energy is not currently fully understood. Further, it is not understood why some are seen on radar and others not unless they are comprised of some type of variable (electron) density plasma.

4. Timing is important in the responses of the human brain to these events. In particular, at night time (e.g. 0400hrs) certain individuals' cyclo-rythmic profiles are heightened, for example, their right hand side brain intrusions. These enhancements are also associated with transients above normal activity in both left and right brain hemispheres. The enhancement of the left being especially associated with

intense linguistic processing, connected with creativity and inspiration, where enhanced profound understanding of self and surroundings prevails.

TERRESTRIAL & AIRBORNE BUOYANT CHARGED BODIES

5. If it is assumed that at least some UAPs are buoyant electrically charged bodies, comprising aerosol particles, gas clouds, and plasmas, then intuitively one would expect that any changes in the electrical environment would modify the movement of the charged body. The internal charge equilibrium and hence vertical and horizontal position of the body is dependent upon the ambient earth/atmospheric electrical charge, in which the body is immersed. Sources of local electrical and magnetic field energy for the charged body appear to be:

- Electrical charges, caused by particle friction due to wind, weather, and turbulence.

- The addition of extra chargeable particles, due to dust clouds, emissions from industry, power stations, jet aircraft exhausts and volcanic or earthquake activity.

- Charged atmospheric conditions, caused by electrical storms.

- EM energy from very high power radio/radar transmitters.

- Electrical fields surrounding open power distribution lines, rail electrification lines, transformers, sub-stations, etc.

- Charges on moving bodies due to their motion in the earth's magnetic and electrical fields.

6. The spread of energy levels is considerable. Some of the fields, though relatively weak, are known, for example, to attract ball lightning - which can dart towards what is presumably sensed as an attractive opposite charge. It is believed that the combination of buoyancy, due to the prevailing temperature and pressure conditions and the earth's local electrical and magnetic field conditions at the time are primarily responsible for the presence, positioning, velocity, direction of motion and altitude of the plasma-type UAP. The presence of an aircraft (with it's own accompanying electrical and magnetic fields), together with it's electromagnetic field emanating from radios, radars, altimeters, etc., must also be a potential source of attraction, repulsion or modification of other fields (or of the total vector-summed fields) present in the location. This must have the potential to influence any charges bodies which happen to be present nearby in an equilibrium-charged condition, and hence susceptible to external fields.

7. The key question is whether the balance of charges, which might be expected to keep a UAP (of the charged mass type) otherwise continuing at the same speed and height will be diverted by another charged body (either airborne or on the ground) and at what range this attractive or repulsive force might act. It must, however, be remembered that electrical forces are not the only ones present. If there is a body temperature differential, heated gas buoyancy forces will also be acting on the body and, if there is forward motion, aerodynamic forces. One can therefore postulate a charged mass which reaches some equilibrium, where both buoyancy and earth's local (surface and atmospheric) electrical charges control

altitude, while a combination of wind and horizontal electrical charges control motion in the horizontal plane.

8. If more than one such body is present at the same time (as is often reported), then presumably additional interactive forces come into play which may or may not keep them in close proximity to each other. Similarly it is suggested that charged bodies which come within close distances of aircraft may either do so coincidentally or as a result of the changing electrical potential in the atmosphere as an aircraft passes through. Researches in this area show that the US Scientific Advisory Panel (1953) was probably close to the truth when it commented that the 'Foo Fighters' (acknowledged to be 'balls of fire' when they came close to aircraft, both in Europe and the Far East during WW2) were believed to be 'electromagnetic phenomena - unexplained but apparently not dangerous'.

9. **'Foo Fighters'** It is logical to question both why few aircrew reports of 'foo fighters' are currently received - and of the currently reported phenomena to question whether these are the same or not. There are a number of reasons which may be postulated for reduced numbers of 'foo fighter' reports, compared to the World War 2 period:

- During WW2 very large numbers of relatively slow military aircraft were flying for long sorties at an altitude of up to ~20,000ft. The majority of aircraft today, (except light aircraft, helicopters and FGA types on low flying) rapidly climb to economic flight levels. Hence, there are now fewer aircraft flying in the region where UAPs are most likely to be seen.

- It is believed that the majority of plasma formations will be short-lived, reducing observation opportunities, unless the aircrew happen to be in the right place at the right time.

- During WW 2, all large military aircraft, used many more 'Mk1 Eyeballs', than currently is the case, to view as much of the sky as possible. This was essential to avoid collision, for navigation and to spot attacking aircraft. Look-out was kept from the tail, the astrodome and by the Waist Gunners - all with opportunities for spotting any rearward following objects.

10. If it is postulated that the 'foo fighters' are the same as UAP, with mainly neutral buoyancy, they probably move towards a set of attractive electrical forces at constant altitude. It can be further suggested that a formation of large aircraft (as in World War 2) would have presented an even greater electrical attraction force, for any oppositely-charged mass. If the foregoing postulations are correct, then the inevitable conclusion is that today one should expect to find that:

- The highest proportion of airborne encounters will be between the ground and ~15,000ft.

- UAP reports could be expected to be concentrated where mainly ascending and descending aircraft are present (e.g near busy airfields, air-traffic zones, holding patterns and air corridors).

11. It is important to note that while it is **not suggested that aircraft are the cause of UAPs, the presence of aircraft may encourage the presence of a UAP, once formed**, as it seems that the aircraft position and velocity can influence UAP activity. It is noted that there is an electrical current flow in an airframe due to the Earth's magnetic field. This is dependent upon the aircraft size and its velocity.

Further, with its much less streamlined shape and rougher surfaces, there were many opportunities for friction-induced electrostatic energy to build up on older aircraft. It is suggested that if the 'foo fighters' were due to charged buoyant bodies, then they may have had more of an attraction to the WW2 aircraft than present aircraft. It is also possible that the charged combustion particles from these older aircraft, using petroleum rather than kerosene, caused some further differences in charge and, finally, that there may have been a significant influence of overall charge in the atmosphere when huge formations of aircraft were flown.

12. It should be noted that the foregoing, in the mind of the reader, be it ball lightning, charged aerosol, gas plasmas etc., will undoubtedly be imagined as a wholly visible event which can also be seen by observers from the ground or from an aircraft, despite the fact that this is most probably happening invisibly for much of the time. It only becomes a UAP when it can be seen! We have always assumed that there is no collision threat to aircraft if nothing which appears solid can be seen in the way ahead!

13. A plasma is the fourth state of matter, comprising charged particles, electrons and ions. Plasmas in a magnetic field form a particular anisotropic media in which various electromagnetic and electrostatic waves can propagate. The electron plasma frequency can be determined from the electron plasma density. An ion plasma density also exists, which, because of the ion mass, is at a much higher frequency than the electron plasma frequency. It is often forgotten that the magnetosphere of the earth comprises low density plasmas and weak magnetic fields. While interest in radiation phenomena in plasmas has become a topic of interest in space communications (e.g. to and from spacecraft), in the UAP context the interest is in ionised plasmas which become visible. It can be shown, in anistropic plasma wavefronts, that cylindrical and cone-types can be produced from point oscillating sources, in addition to standard spherical and spheroidal wavefronts. This may be relevant to some reported UAP events.

14. **Proximity to Strategic Assets** It has been suggested (even claimed in some quarters) that 'UFOs' are 'spying'on strategic installations, such as power stations, airfields and nuclear facilities. There is no evidence whatsoever from the statistical analysis made to substantiate this claim. Several points are considered significant in this respect. For example, events of the 'close encounter' category (which can cause human effects) occur less often in city or in urban areas. It is believed this is due to the large number of electrical discharge paths which cause the UAP to dissipate quickly when near to dense population areas. Further, as they are not as visible because of the ambient light, they are less likely to be approached. In rural terrain (especially in mountains and hillls) and open country in general there are fewer discharge paths via buildings. This is likely to cause charged bodies to be attracted to the few attractive areas where electrical activity, gases and particles in suspension and dusts (e.g from plant, power generation stations, power sub-stations and pylons) are located. They are similarly attracted towards isolated structures, and moving isolated vehicles, overhead rail electric lines and telephone lines.

15. **Nuclear Radiation** It has been claimed in some circles that residual traces of nuclear radiation, above normal background levels have been measured, where a 'UFO' has reportedly 'landed'. There is no UK evidence to support this. However, it has been reported by UK (Culham) researchers, that there **may** have been slight radiation rises at the earth's surface (above natural levels) following **lightning.** Two conclusions can be drawn:

- The fact that there is no UK 'post-landing' evidence is because no timely measurements have ever been made.

- Follow-up measurements (no measurements are known to MOD), for example, taken by other organisations, may well be due to a lightning/plasma cause, not fully understood.

16. **Sound & Smell.** Comments are made in Volume 2 on the probable reasons for lack of sounds on well over 95% of the reported UAP events. It is further noted that when sounds are reported (excluding those from unfamiliar but misreported aircraft) they are personal perceptions and would probably have been reported quite differently **had they not been accompanied by a visual stimulus - and sometimes by a temporal lobe stimulus.** Thus, plasma/ball lightning phenomena (even spherical) can quickly turn into a 'saucer with a dome above and beneath' Such an entity is 'expected' to hum or whine (and increasingly so on 'take off'). It is pointed out that electrical phenomena in air (Working Paper No 1) in the form of arcs, discharges and fields, often hum and crackle and that the electrical activity (in the presence of nitrogen), causes obnoxious odours. It is well-known that electrostatic fields cause hair to bristle (in addition to any fear factor in the scenario the observer believes he or she is seeing.

UAP PLASMAS

17. The most important facts, discovered as a result of the supporting research at Volume 2, are that several types of charged mass can exist in the atmosphere and ionosphere. These are:

- EARTHLIGHTS

- CHARGED AEROSOLS

- BALL (& BEAD OR GLOBE) LIGHTNING

- IONOSPHERIC PLASMAS

- FIREBALLS (Possibly a variation of ball or 'globe' lightning)

- All are sufficiently rare in their visible forms to be categorised as 'UFOs' by the average witness. **It is postulated that plasmas are the result of incompletely burnt-up meteors, which do not reach the earth as meteorites and which are probably responsible for the hitherto unidentified phenomena which cannot be attributed to other known causes.**

- BALL LIGHTNING & EARTHLIGHTS appear to radiate both visual wavelengths and (probably) electromagnetic waves, or/and fields of an unknown nature.

- It is postulated that the plasma formations formed from some meteors also emit, not only visual and IR wavelengths, but some form of probable modulated magnetic field or fields.

- Calculations (from generic UAP body sizes as a radiating aperture) appear to confirm that these radiations have been experienced/encountered by many witnesses. They have always been within

what is known, in the theory of electromagnetic waves, as the 'Near Field'. Some, but not all have suffered adverse medical effects, while others have apparently experienced temporary biological changes described as 'lost time', 'abduction' and even 'medical examination', invariably accompanied by descriptions of 'alien' entities. Despite the vivid recollections no non-human physical evidence ever remains after the event. For example, no magnetic after effects are traceable on vehicles, despite their engines reportedly stopping or their radios becoming inoperable. This inevitably points to the temporary presence of a non-permanent magnetising influence (i.e. **not** a direct current magnetising force); in other words a fluctuating/alternating field.

- Plasma-type events sometimes cause lights in the sky. Further, it is possible to influence charged masses by the application of external energy. [Ufologists call this effect a Close Encounter of the 5th kind (see paragraph 17)]. An irradiation of a 'UFO', using external energy (e.g. a laser beam), can apparently cause some 'lights' to change form. There is also a scenario where radar energy can cause a non-visible, but highly charged gas plasma to cross a charge threshold and become 'triggered' and thus become visible. (Working Paper No 24). It is easy to see how the uninitiated interpret this as a 'response' from the 'craft' or it's supposed 'occupants'.

- Only on the rare occasions when lights are seen at very close range (probably within 10-20m outdoors or within the same room indoors) do reports change from purely visual events to reports of exceptional experiences and descriptions. It is therefore deduced that if an observer is exposed (in the open) to a 'close encounter' (much closer than the Ufologist's CE1), then they are likely to come within the influence of a field (or fields). It seems likely that in particular, if, as described (at Working Papers No.1 & 25) a 'hot spot' from the charged mass irradiates the witness (often described as a beam of light), then extra-ordinary descriptions follow. There seems to be strong evidence (from the Canadian medical measurements) that at least one component of the field is magnetic in nature and modulated, causing excitation of the brain's temporal lobes. It also seems significant that when similar objects are approached when in a road vehicle or aircraft, the more extreme experiences are not reported.

- 'Hotspots' within the plasma bodies can occur. These reportedly have different colours than the rest of the mass and presumably have different internal temperatures. If they suddenly appear, they are often reported as hatches opening, or lights at portholes or beams.

18. **Proof of Medical Effects** The medical evidence is persuasive (Working Paper No 25) but it does not prove conclusively that magnetic fields **exactly** of the same type used in the Canadian experiments [1] emanate from UAPs and are always the cause of some of the more bizarre reports (e.g. alien abductions, creatures, etc.); since there are no known actual field measurements taken in the presence of any UAP, certainly in the UK and probably there are none taken elsewhere in the world. Neither does it conclusively prove that all UAPs emit **only** magnetic fields - there may be others, including even fields of which there is little current knowledge. Nevertheless, one important finding is that people are not equally susceptible to the magnetic syndrome induced in the experiments. This probably explains why reports are occasionally received of close encounters but without the more bizarre effects.

AIRCRAFT ACCIDENTS

19. Based on the postulation that the sudden appearance of a UAP immediately ahead of an aircraft might cause an accident, the investigation (reported in detail at Volume 3) concentrated on filtering a

large number of military aircraft accidents, which occurred over a thirty year period, where there were no survivors and where the cause was not absolutely determined. Expert air accident advice and access to records was provided by IFS, RAF Bentley Priory.

20. In the majority of cases accident records could show that technical reasons - albeit unknown or impossible to confirm - were the cause. However, a small number of unexplained accidents remained, almost always while flying at high speed and low altitude. These were re-examined in some detail and the UAP database was interrogated in a search for the tenuous connection of reported UAP sightings in the immediate accident vicinity; or of unusually high numbers of UAP reports in UKADGE on the same day and in the same time bracket.

21. For about half the accidents identified (pre 1976) the UAP records no longer exist in DI55 - correlation studies could not be made. For the remaining (very few) accidents, no firm UAP event correlations could be established, although the correct atmospheric and electrical conditions must have existed for the formation of UAP on those particular days, as UAP reports were received. **While this neither confirms or denies the cause of the accidents, the sudden and startling presence of a UAP cannot be totally ruled out**. The probability of this occurring seems to be very low - certainly much lower than the probability of a bird strike. However, it should be noted that while even a large bird would not necessarily be seen by the crew (and hence no evasive action taken), the reported visual size of many UAPs is much larger than an aircraft and would almost certainly cause a major control input because of the surprise factor if a UAP ahead was not spotted until it was very close.

22. There are several other factors to consider:

- Why, if there is a finite probability of a low altitude 'head-on encounter', have there not been at least some instances where a UAP has appeared and the aircraft and it's crew survived? Where are these air-miss/near-miss/close proximity reports?

- As there is no reason, in theory, for the scenario to apply only to low-flying aircraft, it could be argued that aircraft flying at higher altitudes might have, by now, encountered and evaded what seemed to be an imminent collision? The only records are airprox reports, where it was too late to manoeuvre but no damage was caused.

- On the assumption that at least some of the UAP phenomenon is caused by plasmas developed from diving meteors, at worst, statistically, could not an aircraft flying at high altitude have suffered damage or even destruction and gone unrecognised as such?

23. Although a few unexplained 'near-misses' have occurred (see below), there is no evidence of any deliberate or hostile activity, harassment of aircraft in the UKADR, repeated or closing, buzzing, or evidence of a near miss causing airflow disruption. There is no reported evidence of passenger or crew alarm or physical effects on passengers or crews. No reports have been received of any adverse effects which can be attributed to UAP fields on aircraft systems, radios, radars, controls or instruments. It is interesting that no reports have been received of UAP **overtaking an** aircraft in flight, although this has been reported by passengers and drivers in road vehicles. All reports concerning aircraft seem to be of UAP crossing an aircraft's track or approaching, 'keeping station' abeam or of 'following'. As reported below, the time for evasion of approaching UAP is minimal. Reported elsewhere in this report are rare incidents where plasmas (ball lightning) have entered airline cabins. Although there are no reports held

in the Department of this occurring in the UKADR this may have been reported through other channels. However, there is no recollection of this being reported in the UK media either, and it is suggested that it is an extremely rare event and probably more likely in areas of the world where electrical storms are more prevalent.

24. The final part of the collision investigation therefore sought access to air-miss reports where, **in the subsequent air investigation, the second platform was not identified. (that is - it was not necessarily a manned aircraft)**. All the **Airprox Reports** falling in this category in the past 10 years were provided by the Joint (MoD/CAA) Airprox (P) Section at Uxbridge. Although it was not possible to correlate this civil aircrew reporting directly with specific UAP events reported by terrestrial observers, it was noted that:

- On five of the seven occasions when near-miss reports were submitted the electrical storm weather conditions reported were almost certainly those conducive to the formation of lightning plasmas.

- Only on one of the occasions of a near-miss had the pilot made a 'UFO' report - in the other cases the reports had decided that the 'other object' was a real aircraft. Lights seen were reported, for example, as 'navigation lights', despite the fact that the subsequent enquiry could find no evidence of another manned aircraft.

25. In most near-miss situations in daylight the object was **always** too close to take evasive action and it passed very close to the aircraft and no damage was found after landing.

- Descriptions were very similar to the many thousands received from surface observers, including the 'black' objects - about the size of small fighters. (eg. Hawk size)

- There have been no recorded aircraft collisions with UAP.

RADAR DETECTION

26. From the available reports it was clear from the outset that credible witnesses have regularly reported unidentified flying objects, which, from their visual descriptions, could reasonably be expected to be sufficiently substantial objects to produce radar reflections. [redacted] S.26

[1] Dittburger T L & Persinger M A "Intensity of Amnesia is Positively Correlated with Human Abductions.....False Memory Syndrome" Behavioural Neuro-Science Laboratory. University of Ontario. Perceptual & Motor Skills No 77 1995.

CHAPTER 5

SUMMARY OF STUDY FINDINGS

INTRODUCTION

1. This investigation has depended upon the available reports submitted by a widely representative portion of the population over at least 30 years. Some have been trained observers and others have been members of the general public who have responsibly reported a phenomenon which is unfamiliar and even frightening. In many reports the information required is incomplete. Only by statistical analysis is it possible to extract major attributes and form a credible view as to the value to Defence Intelligence. In so doing, the application of several diverse scientific fields have been necessary.

2. A new database was constructed and populated with as many items as possible in the timescale of the study, to enable a number of basic investigations to take place. This amounted to ten years of data, entered from the UAP reports. The Department is aware that, quite apart from the very high media and public interest in the topic, serious 'UFO' research organisations and other Governments have made efforts to identify the UAP enigma. No UAP reports from other nations are available to the Department, other than occasional open-press information and all results have been obtained independently by a scientific analysis of all aspects of the availalble information. It is recognised that some of the information 'released' by other nations may be deliberate debunking or disinformation. This public information has been ignored and, in fact, was deliberately not read-into until conclusions had been reached using purely the data held in the department and appropriate scientific papers and sources.

FINDINGS

3. **Items of Interest to Defence Intelligence** As a result of the studies and considering all the available information, no evidence either of intelligent control of the objects, alleged 'inspections of UK strategic assets' or any hostility or threat has been found. Although there are some allied topics of potential military interest there are no findings in the category of direct interest to defence intelligence.

4. **Unexpected Encounters by Aircraft** Based on the available evidence it is concluded that although unidentified objects regularly appear in the UKADR there is no hostile threat from them to our aircraft, they do not belong to another nation and there there is no evidence of extra-terrestrial activity apart from the very high probability, in some cases, of their connection with meteors.

5. There is a marginal possibility of danger to RAF aircraft flying low and fast due to the potential for distraction and sudden avoidance manoeuvres but not from collision risk. Following the Russian experiences, it would be prudent to avoid trying to 'chase' UAPs and it does not seem to be necessary to take violent evasive action if they are encountered head-on by any aircraft, including civil aircraft.(see Volume 3)

6. **Radar Detection of Plasmas** There are strong technical reasons, supported by the nature of plasmas, to justify why the radar detection of UAP events is inconsistent, xxxxxx S.26
xxxxxx xxxxxxxxxxxxxxx

7. **Related Military Apllications** xxxxxxxxxxxxxxxxxxxxxx
xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx S.26

8. **Unfamiliar Natural Phenomena** It was found that, apart from misreported manned aircraft, satellites, manned or unmanned balloons and birds, there are at least 20 naturally occurring visible phenomena which can appear in the atmosphere - of which both the general public and even trained observers (e.g. aircrew, police, coastguards, etc.) are largely unaware. When these are seen they are reported to the appropriate authority as unidentified (or unexplained) flying objects because the observer genuinely believes that something, not only mysterious or exciting is happening; but an event has been seen which might even be a threat of some sort. Although these objects are usually airborne, on rare occasions they are seen on the ground.

9. **Solar & Weather Conditions** While no direct correlation was found between the incidence of UAP reports and solar events, it is strongly suspected that there is a UAP connection with weather conditions - especially electrical storms, the naturally occurring electrostatic fields and with meteor activity. In particular, the correlation of UAP sightings and meteor activity indicates that UAP are formed (given certain atmospheric temperature, water vapour, density and electrical conditions) when meteors neither completely burn up or impact the earth's surface.

10. **Charged Plasmas in the Atmosphere** There is strong evidence to suggest (manned aircraft, satellites and other more widely known atmospheric phenomena excepted) that the remaining UAP events are most likely due to highly charged plasma entities which can take more than one form, and are apparently formed from more than one cause. These, mainly bouyant, objects can remain stationary, or can move at variable velocity and flight profile under the influence of naturally occurring atmospheric fields and man-made fields. While known fields (Magnetic, Electrostatic and Electromagnetic) are believed to play a significant part in the formation, sustenance and motion of UAP, the possibility of other physical affects, hitherto not characterised, it cannot be ruled. There is much evidence to point to ball lightning as the source of formation of some plasmas which are reported as UAP. There also is evidence, confirmed statistically, to suggest that other plasmas, which are reported as UAPs and not as plasmas are formed by incompletely destroyed meteors (i.e. which have not completely burnt-up but have penetrated to low altitude but not reached the earth's surface as meteorites).

11. It is probable that the occurrence of UAP reports may also be additionally influenced by the presence of highly charged particles in the atmosphere. Apart from the influence of those particles which occur naturally in the atmosphere, such as dust, the frequency of UAP formation may also be influenced by extra air pollution which has undoubtedly increased this century. The precise electrical and atmospheric conditions for UAP formation cannot be determined from the evidence available. While the evidence examined appears to suggest that formation may occur in a combination of certain electrical and possibly sustained in moist air conditions, it was beyond the scope of the study to examine all the relevant past meteorological records. The increased frequency (taken as a trend which does not continuously increase year on year but does so overall) in UAP reports received by MoD over the last 50 years suggest that

changing climatic conditions and UAP reports are somehow connected. This, it is suggested is almost certainly enhanced by the corresponding increase in meteor activity.

12. No further investigations were made to determine whether there is correlation between certain combinations of atmospheric conditions and UAP events. One of the considerable difficulties of such an investigation - which is beyond the scope of the TORs of the study (quite apart from cost and effort which would be involved), is the key factor that a UAP might be formed in one place where conditions are conducive to its formation, but remain unseen until it has travelled to another location where, for the time being, it is sustained by it's own and other ambient attributes, moved around by extant external influences, but no longer in an environment in which it would have originally been formed. This motion clearly affects UAP (plasma) life and shape.

13. **Human Medical Aspects** No attempt was made to consider furher the physiological and psychological aspects which impinge on the topic of UAP, when 'close encounters', including the 'abductee' and 'contactee' scenarios allegedly occur. Such events are relatively few in the UK, none have included measurements and the department has no knowledge of any follow-up medical investigations which may have taken place. They do not impact on the findings. It is clear, however, that such events only happen (such as can cause physical injury or equipment interference on occasions) when a human is quite close to the phenomenon. In this respect, the most important finding is the potential connection between the modulated magnetic fields, used in the Canadian medical experiments which seem to produce the same effect on the human mind as those experienced by those few witnesses who have been very close to a UAP.

14. **Dependence on Culture** No attempt was made to consider further 'cultural tracking' - other than to note that in the late 19th and early 20th centuries (well before the time of this Department's Reports!) UFOs were reported as 'Airships' - complete with propellers and cupolas. [As an independent check it is particularly important to note that the examples given at Annex C (Czech examples years 1607 to 1985) have exactly the same basic descriptions as those reported today]. The first 'saucer' description was erroneously given this name by a journalist in the USA in 1947: ever since, witnesses expect to see this shape. The presence of domes, portholes and landing gear, inevitably in the form of tripod legs and the like, soon followed!

STUDY RECOMMENDATIONS

Key Recommendation

15. Although the study cannot offer **certainty** of explanation of all UAP phenomena, the existing evidence is sufficiently persuasive to make **one** key and **five** subsidiary recommendations:

- **It should no longer be a requirement for DI55 to monitor UAP reports as they do not demonstrably provide information useful to Defence Intelligence.**

Subsidiary Recommendations

- Selection of a ten year UAP reporting period for detailed statistical studies, allowed material from both the Cold War and post-Cold War periods to be studied. **No significant differences were discovered in the results from these two time periods.** For this and other reasons it is not expected that further inputs to the database will significantly change the findings stated in this Executive Summary. Consequently, and **in keeping with the key recommendation, it is recommended that there be no further requirement for maintaining the database.**

- The flight safety aspects of the findings should be made available to the appropriate RAF Air Defence and other military and civil authorities which operate aircraft, particularly those operating fast and at low altitude.

In so advising:

- **It should be stressed that, despite the recent increase in UAP events, the probability of encountering a UAP remains very low.**
- **No attempt should be made to out-manoeuvre a UAP during interception.**
- **At higher altitudes, although UAP appear to be benign to civil air-traffic, pilots should be advised not to manoeuvre, other than to place the object astern, if possible.**

- **The reasons affecting the variability in radar detections of UAP by UKADR (and civil air traffic) sensors, should be passed to the appropriate operating authorities.** [redacted] S.26

- The relevance of plasma and magnetic fields to UAP were an unexpected feature of the study. [redacted] S.26

- **It is suggested that the findings of this report could be used to provide the public with a balanced view of UAP reports and MoD involvement. It is recommended that this report be made available in a suitable form for public release. (R)**

16. **The Way Ahead.** In view of the public sensitivity on the topic (and the media vested interests in keeping the topic in the public eye), it is suggested that the technical and other relevant knowledge gained in the Department as a result of this study may be of value in any wider policy decision on the way ahead. While this can be seen as ensuring accuracy and consistency in any statement which might be made, it would also protect the DIS involvement which has, unfortunately, become public knowledge due to

circumstances beyond our control. Above all there will, most likely, be a need to respond to the inappropriate statement that the MoD has not carried out any UAP investigations, which was issued in a written reply, by another Department.(R)