The CONTACT Equation

$$N_s = T_c / N_{ca}$$

$$= (C)(N_{cp}) / (365)(A)(N_{cd}) = (P)(f)(N_{cp}) / (365)(A)(N_{cd})$$

The Contact Equation was first developed by Stephen Bassett, Executive Director of Paradigm Research Group. It attempts to address a basic question: If "X" number of people are experiencing direct physical contact with extraterrestrials, how many extraterrestrial ships would be necessary to service the amount of contact reported. The contact equation is important for showing the reported level of physical interaction is possible given what is known about the phenomenon. The results provided by this equation, like the results from the Drake Equation, are subject to change as more information becomes available. Stephen Bassett and Dr. Gordon G. Spear of Sonoma State University have collaborated on developing this model.

Introduction

At least since the mid-1940s numbers of people have reported seeing unusual ships in the sky and on the ground. This is a part of what is commonly known as the UFO phenomenon. Many thousands of UFO reports now exist in several large databases, and new reports are currently being submitted at a rate of about 600 each month.

While it is well established most UFO reports are merely misperceptions of ordinary objects or phenomenon, it is also well established approximately 10% of UFO reports cannot be explained or identified. Many theories have been presented to explain this 10%. The most commonly considered theory (and the most interesting) is the extraterrestrial hypothesis. This hypothesis suggests the unexplained reports are the activities of extraterrestrial life forms (ETs).

One aspect of the phenomenon is the apparent direct interaction between ETs and humans. These interactions are often reported as abduction events. Abduction events involve the removal of a person without permission from their normal environment and placing them in an unfamiliar environment where medical and psychological procedures occur. The abductees are ultimately returned to their normal environment, often with only fragmentary memories of what has happened. These events are often quite traumatic for the person and leave them suffering from Post Traumatic Stress Disorder (PTSD). Other forms of physical contact are reported that are not viewed as abductions and tend to be more positive without any associated trauma. The ETs encountered in these contact experiences reportedly are trying to help humanity and our planet.

The description of the ETs involved in all these direct interactions indicates only a few consistent types. Some interactions, especially the contactee experiences, involve ETs which appear surprisingly human.

Surveys of the U.S. population and the populations of other countries continue to report substantial numbers of people believe they are having abduction or other physical contact involving direct interaction with extraterrestrial beings on an ongoing basis. If this is true, it is obviously not a matter of when we might achieve contact with extraterrestrial life, for contact is currently taking place on what appears to be a daily basis. Since 1980 over one million written accounts of such contact have accumulated in the files of researchers throughout the world.

The more conservative survey results suggest approximately 2% of the American population believes they have had at least one contact event.* With the current U.S. population at about 317 million, this would imply that there are 6,340,000 people out there in the U.S. that have experienced a contact event. For example, this suggests that in a classroom with 50 students, there is probably one contactee. Or, the next time you go to the supermarket where there may be 100 or more people, there are probably at least 2 contactees who are shopping there. A more intriguing consideration is the 539 members of the U.S. House and Senate would include approximately ten contactees. [Note: the term contactee in this context only refers to humans having physical contact with extraterrestrials.]

Some details of the contact phenomenon

- In terms of what is known, contact can take place in a room within a person's home, in the vicinity of a person's home, at some arbitrary outdoor location, in a car or other vehicle, in an ET ship, or in a large ET facility or base.
- Contactees report the ETs seem to know where they are when they want them. Going on vacation does not help. Moving to another town or to another state or country does not help. If the ETs want you, it seems that they can find you.
- Some contactees report that artificial implants have apparently been placed in their bodies. These implants can occur in the nose, arm or leg. When implants are surgically removed it appears they are composed of a composite of metals and carbon nanotubes. These implants do not appear to be affected by the body's normal rejection processes.
- Contacts can take place at any time of day or any day of the week, but encounters are more common during the middle of the night hours. The ETs appear to work 24/7 and 365 days a year.
- Contacts appear to take place throughout the lifetime of a person and can begin in early childhood.
- The total number of contact experiences for a person and the frequency at which they occur seems to be highly variable. Some people may have several experiences in a week, while others may only have an experience every few years. The actual extent of this activity is extremely difficult to document since people often do not have complete memories of these experiences. It seems that people may be have contact and may have no conscious memory of the experience.
- If you are having contact, then it is very likely that your mother, your father, or both have had or are having contact

- If you are a contactee and you have children, it is likely one or more of your children are having contact.

Some implications of ongoing contact and a simple model

If the polls reliably represent the numbers of physical contact events, then there is a great deal of ET activity which must be taking place. It is possible to develop a simple model to determine possible levels of ET activity. As an example, we will develop a model to represent the physical contact events occurring now in the United States. For the purposes of this model we will assume that each contact event is facilitated by the presence of some type of ship. This model can then be used to predict the total number of contact events taking place in a specified time interval, in an area of specified size within the U.S., and an indication of the number of ET ships needed to support this activity. The results for this simple model will be averaged over the entire U.S. (50 states plus District of Columbia) and over the average age of the U.S. population.

The parameters of the model

P	population of the U.S.
S	size of the land area of the U.S. (square miles)
f	fraction of the U.S. population who believe they have had physical contact with extraterrestrials
A	average current age of the U.S. population (average number of years lived per person)
N_{cp}	average number of physical contacts per person over current average U.S. population age
N_{cd}	Average number of physical contacts an ET ship can facilitate per day
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C	$C = P f$ (Americans currently having physical contact with ETs - contactees)
T_c	$T_c = C N_{cp}$ (total contact events over the current average U.S. population age)
N_{ca}	$N_{ca} = (365) A N_{cd}$ (number of contact events **one** ET ship could facilitate over the average U.S. population age)
N_s	$N_s = T_c / N_{ca}$ (number of ships needed to facilitate all contact events over the current average U.S. population age)

Other calculations of interest

R	$R = T_c / A$ (rate at which contact events take place, total events per year)
D	$D = C / S$ (average population density of contactees per square mile)

Some known and possible values for the parameters

P -- The current population of the U.S. (2014) is commonly reported as 317 million (317,000,000).

S -- The land area of the U.S. is approximately 3.8 million square miles

f -- The fraction of the U.S. population that reports they believe they have been physically contacted varies substantially depending on the nature of the survey. The values reported seem to vary between a low of 2% and a high of 6%. Regardless of whatever value within this range one might choose, this corresponds to a huge number of people! This suggests a rather large numbers of people appear to be experiencing contact events with ETs. For the purposes of this model we will adopt the lower limit of 2%.

A -- The median age of the U.S. population (or the average age per person) is 37.2 years as of 2014. Therefore, the total number of human years for the purposes of this equation is 37.2 times the total population. The equation does not factor for contacts occurring more or less frequently during person's life span.

N_{cp} **--** The average number of contact events per contactee over the average age of the U.S population is a more difficult estimate and completely dependent upon contactee reports. An extensive and costly survey of the one million plus reports will be necessary for an accurate number. For now let us assume one per year beginning at birth. This would correspond to 37. It is well established that individual experiencers can have values for this parameter much greater than this, while some experiencers seem never to reach this value during their lifetime.

N_{cd} – The average number of contact events an ET ship can facilitate per day. This is perhaps the critical constant for the Contact Equation. How long it takes for a contact event has three components: 1) what is known about the performance capabilities of the ships involved, 2) what is reported by contactees as to their time estimate and what takes place during the contact, and 3) how many hours during the day are the ET ships active.

The nature of extraterrestrial ships

A ship travels to the location of the contactee, may possibly transport the contactee to some other location, and then transports the contactee back to the location from which they were taken. For the purposes of this model the ships considered are the classic moderate size disk or ship. However, shapes other than disks have certainly been reported. A typical size may be about 30 feet in diameter, some slightly larger, some smaller. This model does not consider the very large triangular and cigar shaped ships that are also commonly reported in the literature. These larger ships may be the locations to which some contactees are transported.

According to commonly reported characteristics, the ships can apparently appear and disappear, can appear or not appear on radar, can travel at extremely high rates of speed in any direction (including straight up and down), can change direction of motion seemingly instantaneously without slowing down or banking, can hover, can have something similar to running lights (or not), and are normally totally silent. This would be true for any location anywhere on the Earth or in orbit around the Earth. Travel times could also be relatively short to more distant locations such as the Moon. (It has also been suggested some ET ships may also slip into other or higher dimensions. For such technology, travel times could be effectively instantaneous. However, this option is not considered for this model for the Contact Equation as the evidence is still much too thin.)

Also, the useful lifetime for one of these ET ships is unknown. But given the advanced technology of these ships that are facilitating the contact events, it is a reasonable assumption that lifetime exceeds the average age of the U.S. population and is not a factor.

In summary, the maneuvering and other characteristics of the ships are quite advanced, which is important in calculating the number of contact events per day.

Contactee reports of activity and duration

The most impacting consideration is the contactee reports regarding how long they were gone during the event, and what occurred during the event itself.

Both the time estimates and the activities reported vary a great deal. As noted with the N1 parameter, an extensive and costly survey of the one million plus reports will be necessary for an accurate number. For this reason an average time constant is very difficult to assign. The authors of the Contact Equation are in agreement a lower average time limit is one hour and a higher average time limit is four hours. Below you will find two calculations using these two limits.

Hours per day of contact activity

Not surprisingly, most contacts are reported as happening during the middle of the night between the hours of 10 pm and 6 am. Some contacts do occur during other times of day. For our purposes we will assume eight hours of activity per day.

Results for the standard model

The following results are obtained for the above values for the parameters. Different values for the parameters will produce different values for the results. Recall that these results are averages over the entire U.S. and over the average age of the U.S. population.

Parameter	Value	Description	Units
A	37.2	average current age of the U.S. population (average number of years lived per person)	years
C	6,340,000	number of people currently having physical contact experiences with ETs	people
P	317,000,000	current population of the U.S.	people
T_c	234,580,000	total physical contact experiences with humanity over the average U.S. population age	contact events
f	.02	fraction of the total population having contact	
R	6,305,913	rate of contact events per year	events per year
S	3,790,000	total land area of the U.S.	square miles
D	1.67	population density of contactees	contactees per square mile
N_{cp}	37	number of contact events one ET ship facilitates per person over the average U.S. population age	contact events
N_{cd}	8	number of contact events an ET ship could facilitate per day based upon an average event time of one hour. Four hours would equal 2.	contact events
N_{ca}	108,326	number of contact events one ET ship could facilitate over the average U.S. population age	contact events
N_s	2,160	number of ET ships needed to facilitate all contact events within the territory of the U.S over the average U.S. population age	ET ships

Contact Equation Results

$$N_s = T_c/N_{ca}$$
$$= (C)(N_{cp}) / (365)(A)(N_{cd}) = (P)(f)(N_{cp}) / (365)(A) (N_{cd})$$

$N_s = (317{,}000{,}000)(.02)(37) / (365)(37.2)(8) = 2160$ **ships**
[With event duration of one hour]

$N_s = (317{,}000{,}000)(.02)(37) / (365)(37.2)(2) = 8640$ **ships**
[With event duration of four hours]

If the fundamental variable – the average number of contacts per person over the current average age - is halved and not 37 but 18.5, following results are:

> Number of ET ships needed: 1080 [with event duration of one hour]
> Number of ET ships needed: 4320 [with event duration of four hours]

If the fundamental variable - percentage of contactees - is off by a factor of five, and the actual number is not 2 percent but .4 percent, the following results are:

> Number of contactees: 1,268,000
> Number of ET ships needed: 412 [with event duration of one hour]
> 1,728 [with event duration of four hours]

Even at .4%, would anyone suggest these numbers are of no concern to the American people?

Some comments based on 2% of the population, one hour event times, and 37 contacts per person

The results, if taken literally, can be quite shocking. They suggest a major engagement of the human race with advanced extraterrestrial life. ETs would appear to be interacting with humans on a massive scale. Obviously, the key parameter that produces these results is the fraction of the U.S. population which surveys have indicated may be experiencing physical contact with extraterrestrials. It is also important to keep in mind this model is an average over the entire U.S. over the past several decades. The comments which follow will attempt to provide some perspective for the results of the standard model.

C = 6,340,000

This is the projected number of living people who have had or are having physical contact experiences. This is a huge number comparable to the current population of the state of Tennessee, Washington, Massachusetts, Arizona, or Indiana.

$T_c = 234,580,000$

This is the total number of physical contact experiences with humanity over the average U.S. population age (37.2 years). This is a also huge number representing over 230 million contact experiences during a period comparable to the length of a human generation. It would certainly have given ETs a substantial opportunity to interact with humans and conduct elaborate study and projects.

$R = 6,305,914$

This is the rate of contact experiences per year. It corresponds to about 17,000 events per day, and about 2100 events every hour based upon eight hours per day of activity. If this is a correct representation, how many of our friends, neighbors, or relatives are having contact today?

$D = 1.67$

This is the current population density of contactees - the average population density of contactees per square mile in the U.S. at the present time.

For comparison, the average population density of the U.S. is currently 84 people per square mile. Of course, the actual population density varies dramatically from a high of 69,000 per square mile in the vicinity of New York City to considerably less than a few persons per square mile in the more isolated regions of the country. The U.S. is organized into 50 states and each has 2 senators. The individual states vary rather dramatically in size and population. The U.S. is also organized into congressional districts within states based on population. Each congressional district has an elected congress person in the U.S. House of Representatives. There are currently 435 congressional districts. While these districts also vary substantially in size, the average size of a congressional district is 8113 square miles. This would mean on average each congressional district is home to more than 14,000 citizens who are experiencing physical ET contact.

On an even more local level, each state in the U.S. is divided into counties for administrative purposes within the state. Counties tend to be larger in size in the west and smaller in the east and mid-west. Counties vary dramatically in size and some counties, such as San Bernardino County in California, are actually larger than some small states. However, there are 3142 counties in the U.S. and the average size of a county is 998 square miles. This would mean, on average, each county in the U.S. is home to about 2000 residents who are experiencing physical ET contact.

N_{ca} = 108,000

$N_{ca} = 108{,}000$

This is the number of contact events one ET ship could facilitate over the age of the average U.S. population. This adopted time period is 37.2 years. The model assumes that when a contact event occurs, an ET ship is involved in some kind of transportation of the contactee. Thus, this value is also the total number of "trips" taken by ET ships in the vicinity of the Earth. The model also tacitly assumes that an ET ship has a service lifetime at least as great as the time period adopted for the model. (Of course, there is no reason to expect that the ETs could not repair or replace a ship should this become necessary.) Is this an unreasonable or unrealistic value for the number of trips an ET ship could make over its lifetime? How does this value compare to the capabilities of our contemporary technology?

A reasonable comparison might be possible by considering commercial aviation. Air traffic controllers in the U.S. currently handle 28,537 flights each day. This means in every hour of every day there are on average, more than 1000 commercial airline flights in the air. (Recall that based on the rate of contact events there must also be 2160 ET ships in U.S. skies during each hour of the primary activity period.) The U.S. commercial fleet as of 2011 consisted of 7185 aircraft. With more than 10 million flights each year (10,416,005 yearly flights), each aircraft makes about 1450 flights each year. Over the expected service life of 20 years an aircraft would be expected to make 29,000 flights. Of course, with careful and consistent maintenance many aircraft in the system have actually been flying for more than 30 years. Over a period of 37.2 years (the age of the average U.S. population) a U.S. aircraft would be expected to make 53,940 flights. This is actually rather comparable to the requirements for a single ET ship of 108,000 "trips" for the same time period. Of course, the ET technology being considered is obviously more advanced than human technology. If the ETs are indeed traveling among the stars, they are likely thousands of years ahead of human technological capabilities. Making 108,000 "trips" within our solar system over several decades would probably be child's play for an ET ship.

N_s = 2160

$N_s = 2160$

This is the number of ET ships needed to facilitate the number of the persons in the U.S. surveys have projected as having physical contact with extraterrestrials and based upon an average event duration of one hour. This is the number needed over the average age of the U.S. population (37.2 years). Crudely averaged over the 50 American states, the result is 43 ships per state. Is this an unreasonable number of ships?

As already indicated, the current U.S. commercial airline fleet consists of more than 7000 aircraft. This is far more than the 2160 ET ships needed to facilitate the current level of ET contact with the U.S. population. People in the U.S. obviously have great interest in air travel, so we have produced an adequate number of

machines to satisfy this interest. At least some ETs apparently have great interest in abducting/contacting humans, and it would seem they too would have no difficulty producing an adequate number of machines to satisfy their interests.

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