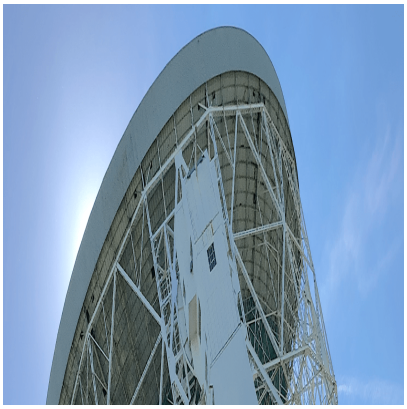

Cryptography for space aliens

Description

â??Anticryptographyâ?• is a loose term to designate a type of cryptographic message that is legible to someone who has **no** knowledge of the plain text language from which the message derives. Nor do they have access to the method of encryption, or anything like an encryption or decryption key. Nor is the message meant to be secret. The message is coded in a way that a codebreaker from any language group, culture or context has a good chance of decoding it. Thatâ??s a big ask. Why would anyone want to create a code that is easy to decipher? Itâ??s for sending messages to extra terrestrials, and making a good guess at how they might already be trying to communicate with us.

> â??Probably the one overriding principle of the outer-spacelings will have been to make their message as clear as possible. It will be coded, but in a code designed for clarity and not for obscurity-a kind of cryptography in reverse, â?¦ an anticryptography.â?•

Thatâ??s a quote from David Khanâ??s book *The Codebreakers: The Story of Secret Writing* on which I am drawing in this post. The relevant chapter in my unpagenated Kindle edition is â??Messages from Outer spaceâ?• chapter 26.

Cosmic Intercourse

The coding system called *Lincos*, from â??lingua cosmica,â?• was invented by the mathematician Hans Freudenthal (1905-1990) who describes the system in his book *Lincos: Design of a Language for Cosmic Intercourse*. The book is available as a PDF online and is dryer than the title suggests. Hereâ??s some sample dialogue in lincos (page 145 of the book).

3 30 4. We repeat the greater part of 3 30 3, but now *Ha* refuses to answer.

Ha Inq *Hb* · ¬ Nnc *Ha* Vul . Nnc *Ha* Inq ! *Hb* Etc :
Hb Inq *Ha* · PAN *Ha* Pol *Hb* . PPN *Ha* Inq ! *Hb* Etc :
Ha Inq *Hb* : Fal : PAN *Ha* Pol · Nnc *Hb* Inq ! *Ha* · ? *y* . t_3 t_4 Fit *y* :
→ : PPN *Ha* Inq ! *Hb* · ? *x* . t_1 t_2 Fit *x* :
Hb Inq *Ha* · PAN *Hb* Inq *Ha* . t_3 t_4 Fit b :
t_5 *Ha* Inq *Hb* · ¬ PAN *Ha* Ani · Utr . *Hb* Inq *Ha* Etc : t_5
t_1 t_2 Fit a :
Hb Inq *Ha* Ben :
Hc Inq *Hc* · t_5 t_6 *Ha* Inq *Hb u* . → . *u* ∈ Fal #

Freudenthal was invited to develop his code by the British Interplanetary Society in the 1950s. The society has a website at www.bis-space.com/.

Lincos qualifies as a cryptographic system rather than a *language*. The sender assumes that the potential recipient has no knowledge of the system, or even that a signal they receive is a coded message. The recipient has to be able to detect that the transmitted signal is likely to contain a message, and is not random noise or an extraneous signal generated by natural phenomena. Freudenthal assumes the medium for a lincos message is electromagnetic pulses. Whatever the medium, the message has to repeat to increase the chances that it will be picked up by someone or something that can read it. The pattern of the repetition may also offer a clue that the signal is a message from intelligent life. According to Kahn,

> â??Lincos would have to be taught to the creatures of outer space before it could be used as a medium of communication, and Freudenthal proposed to do this by transmitting the statements of Lincos, which he hoped would be relatively selfevident, over and over again until the recipients catch on to their meaning.â?•

The motivation for such signalling comes from speculation about life on Mars. Once detected by telescopes, observation of the â??canalsâ?• on Mars encouraged people to invent means of communicating with Martian life, with the best chance of contact occurring when the orbits of Mars and Earth brought them closest. The polymath Francis Galton (1822-1911) highlighted the need for such communication as early as the 1890s. He proposed pulses of reflected sunlight as the means of reaching out to Martian intelligence, and a likely means for them to reach out to us.

Others have proposed less general means of communication. Karl Friedrich Gauss (1777-1855) had proposed planting a massive forest across Siberia in a configuration of triangle and squares that would leave an extra-terrestrial in no doubt that we know Pythagorasâ?? Theorem.

Unsurprisingly, attempts at a celestial code centre on the the assumed universality of mathematics. A second component is the context of the signal. A potential receiver might expect the communication to establish the identify and location of the sender, which could be correlated with other observations

about our own planetâ??s location.

The astronomer Frank D. Drake has added the likelihood that any extra-terrestrial code breaking would involve teams with different expertise, as it would on Earth. According to Kahn, quoting Drake as if this had already happened,

> â??In preparing the message, an attempt was made to place it at a level of difficulty such that a group of high quality terrestrial scientists of many disciplines could interpret the message in a time less than a day. Any easier message would mean that we are not sending as much information as possible over the transmission facilities, and any harder might result in a failure to communicate.â?•

Lincos 101

I doubt many earthlings would have the time or the inclination now to learn precisely how Lincos operates. Kahn provides a useful summary.

> â??He began his program by sending a series of messages to teach the terms â??plusâ?? and â??equals.â?? His first message might be beep beep beep beep bloop beep beep tweet beep beep beep beep beep beep. Next he might send beep beep bloop beep tweet beep beep beep. After sending enough of these for the outerspacelings to catch on to the idea that bloop is â??plusâ?• and tweet is â??equals,â?• he might transmit a message with a new signal, like beep beep beep blip beep tweet beep beep. Soon the spacelings would realize that blip means â??minus.â?• Similarly, Freudenthal would build up an entire mathematical vocabulary.â?•

Here it is in symbolic form

1 1 1 1 o 1 1 0 1 1 1
1 1 1 Ã? 1 0 1 1

A smart recipient might thereby assume that â??oâ?• means â??plus,â?• â??0â?• means equals, and â??Ã?â?• means â??minus.â?• So thatâ??s a start. From there the anticryptographer proceeds to communicate the concepts of time and space! SETI, the Search for Terrestrial Life Institute, continues the search.

The idea of a cryptographic code designed to be broken is interesting from the perspective of the built environment. Anticryptography is a version of the challenge we encounter all the time in communication. Itâ??s the challenge of learning oneâ??s first language as an infant. We donâ??t have to memorise a code before we can speak and understand. We learn language as we use it, from mimicry, context and feedback. Thatâ??s the same with the built environment. Devices, machines, buildings, streets, furniture, parks etc. convey the means of their understanding, or they could if designed accordingly. See post Secret norms.

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Note

- Image above is Jodrell Bank Radio telescope, England, taken May 2019.
- Image below was taken at the National Space Museum in Leicester, England. Itâ??s a full scale model of the Giotto, the European Space Agencyâ??s first planetary mission. In 1986 it flew through the tail of Halleyâ??s comet.
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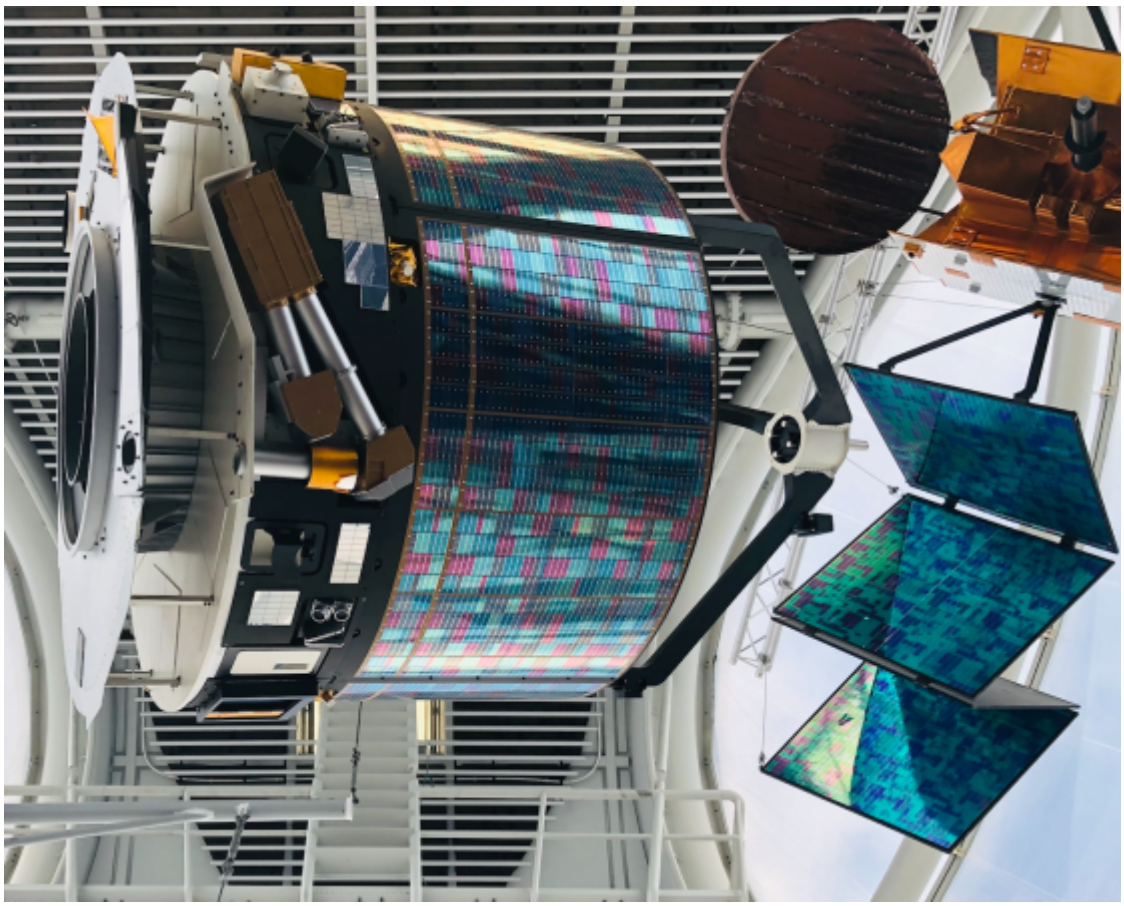

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1. Travel

Tags

1. cryptography
2. extra-terrestrial
3. language

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