

# Classification of Interstellar Radio Messages

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*Using the proposed classification criteria, all known interstellar radio messages are divided into two essentially different groups – scientifically-based messages and pseudo-messages. Imitation of interstellar transmissions by most of the exo-civilizations can cause the Great Silence.*

In order to classify IRMs (Interstellar Radio Messages), let us select from the so-called “METI-list” [1], which contains ten questions featuring some cardinal and concrete issues, with the purpose of verifying whether a given IRM can be considered a valid transmission or not. In other words, we propose to rank the planned and already sent IRMs depending on how well they meet some basic METI criteria. For example, these basic issues include the following: (1) choice of the target stars, (2) energy required per bit of the information, and (3) availability inside the IRM’s body for a special digital or analog key to allow aliens to decode our message. Thus, in order to rank IRMs, it is necessary to find out whether there are serious concerns regarding how each of these three issues are addressed.

The corresponding analysis shows that only five messages satisfy all three criteria mentioned above in the fullest measure: the Arecibo Message, 1974 [2], Cosmic Call, 1999 [3], Teen Age Message, 2001 [4], Cosmic Call, 2003 [5] and A Message From Earth, 2008 [6]. The Arecibo Message, the first deliberate interstellar radio message, was transmitted on November 16, 1974 using a radar telescope with an antenna diameter of 1000 feet (305 m) and a transmitter with a mean power of 500 kW at a wavelength 12.6 cm. Radio messages of four other projects were later transmitted into space using the Evpatoria Planetary Radar with an antenna diameter of 70 m and a transmitter with a mean power of 100 kW at a wavelength 6.0 cm. Table 1 lists these five IRMs in order of the dates of the first transmission session (notice that the overall number of sessions is 17), the symbols T and E, respectively, the total duration of all sessions of each IRM and the total energy transmitted. The later figure correlates to the range of possible detection.

Table 1. Scientifically-based interstellar radio messages, transmitted from Earth

Name	Arecibo Message	Cosmic Call 1999	Teen Age Message	Cosmic Call 2003	A Message From Earth
Date	16.11.1974	24.05, 30.06, 01.07.1999	29.08, 03.09, 04.09.2001	06.07.2003	09.10.2008

Type	World's First IRM (digital)	First multi-page IRM	First digital and analog IRM	First International IRM	First Collective IRM
Authors	Drake, Sagan, Issacman, et al	Chafer, Dutil, Dumas, Braastad, Zaitsev, et al	Pshenichner, Filippova, Gindilis, Zaitsev, et al	Chafer, Dutil, Dumas, Braastad, Zaitsev, et al	Madgett, Coombs, Levine, Cooper, Zaitsev, et al
Radar	Arecibo Radar Telescope	Evpatoria Planetary Radar			
Sessions	1	4	6	5	1
T, min	3	960	366	900	240
E, MJ	83	8640	2200	8100	1440

The summary shown as Table 2 presents basic data on all 17 transmission sessions for these five terrestrial radio messages. R represents the distance to the target stars, expressed in light years. The last column of Table 2 predicts the time when the “Great Silence of the Universe” can potentially come to an end, reaching any aliens who happen to exist at the receiving side of the communication link, on the highly optimistic chance that they are capable of detecting our radio messages.

Table 2. Details of the 17 sessions of the conducted IRM transmissions

Message	Target	Constellation	Date sent	R, LY	Arrival date
Arecibo Message	NGC 6205	Hercules	Nov 16, 1974	~ 25000	~ 26974
Cosmic Call 1999	HD 186408	Cygnus	May 24, 1999	70.5	Nov 2069
	HD 190406	Sagitta	Jun 30, 1999	57.6	Feb 2057
	HD 178428	Sagitta	Jun 30, 1999	68.3	Oct 2067
	HD 190360	Cygnus	Jul 1, 1999	51.8	Apr 2051
Teen Age Message	HD 197076	Delphinus	Aug 29, 2001	68.5	Feb 2070
	HD 95128	Ursa Major	Sep 3, 2001	45.9	Jul 2047
	HD 50692	Gemini	Sep 3, 2001	56.3	Dec 2057
	HD 126053	Virgo	Sep 3, 2001	57.4	Jan 2059
	HD 76151	Hydra	Sep 4, 2001	55.7	May 2057
	HD 193664	Draco	Sep 4, 2001	57.4	Jan 2059
Cosmic Call 2003	HIP 4872	Cassiopeia	Jul 6, 2003	32.8	Apr 2036
	HD 245409	Orion	Jul 6, 2003	37.1	Aug 2040
	HD 75732	Cancer	Jul 6, 2003	40.9	May 2044
	HD 10307	Andromeda	Jul 6, 2003	41.2	Sep 2044
	HD 95128	Ursa Major	Jul 6, 2003	45.9	May 2049
A Message From Earth	HIP 74995	Libra	Oct 9, 2008	20.3	Feb 2029

On the other hand, the bulk of declared IRM projects cannot be considered to be serious METI-projects, and thus we can describe them as “Pseudo-METI”, [7] or “stunts”. Without going into details and excluding all futile and advertising cases of broadcasts into space (for example, advertising of beer, chips or a new popular scientific book), we shall list some of their defects below.

In the “**Deep Space Communications Network**” service, [8], radio messages are being transmitted with no definite address, low power, and without any special encoding that would allow decoding of these messages at the receiving side.

**Craigslist Messages** [9] were sent, using the “**Deep Space Communications Network**” service, so they have all the defects listed above.

**CNES Cosmic Connexion.** At the official website of the Centre National d’Etudes Spatiales (CNES), a search for the word combination «CNES Cosmic Connexion» brought in only one result [10], which indicates that this project has not yet been realized and is unavailable for analysis.

“**Poetica Vaginal**” was Joe Davis’s first project, and as follows from its description [11], it used the Millstone Hill Radar (MHR) for transmission. However, this is a pulse radar [12], with a pulse width about 1 msec, and no one has explained in [13], how the pulse radar was used for transmitting the “vaginal sounds” or what kind of upgrade to the MHR was required before transmission. Nor is it clear what Joe Davis meant when he commented, “Then, on the eve before live broadcasts were to be made, the Millstone project Group Leader, a United States Air Force Colonel (Millstone Radar had been contracted to the Air Force by MIT) terminated the project. Still, a few minutes of test transmissions were made to each of the four Sun-like stars.” There are at least two questions here: was this transmission illegal and underground, and how was such a massive antenna, which has considerable inertia time, able to send radio messages to all four stars in just a few minutes?

“**Doritos Advert**”, [14]. This message does not meet the requirements of (2) and (3): the energetic potential of the EISCAT Radar [15] is very small compared to that needed to overcome huge interstellar distances, and the Doritos advert’s authors did not use special encoding, but instead transmitted the video file in a terrestrial compressed format (an MPEG) which definitely cannot be decoded by aliens into a “Doritos” video advertisement.

**RuBisCo Message** [16] was Joe Davis’s second eccentric project. Again the technical questions of transmission remained at a frivolous level. Joe Davis wrote: “Arecibo’s “coder” (a device that interrupts the two megawatt radar signal at precise intervals) was down [???.]” Thus (he continued), “we converted the 1434-mer RuBisCo sequence into an analog audio file that I recorded on my iPhone. Then, we actually interfaced my iPhone with Arecibo’s powerful radar and transmitted from approximately 11:30 p.m. until 12:45 a.m.” Such activity should evoke nothing but an ironic smile from radio scientists who are experts in deep space communication.

**Penguin UK Message** [17]. This transmission was promised by Paul Davies while advertising his book “The Eerie Silence”. For this interstellar transmission the Satellite Earth Station at Goonhilly in Cornwall, UK was used. The largest dish at Goonhilly has a diameter of only 32 meters and a mean transmitter power that does not exceed a few kilowatts. The recipient of this interstellar radio messages was, for unknown reasons, selected to be the Orion Nebula. In addition, no special techniques were used for converting the text of individual messages, facilitating their perception by probable aliens.

**“Klingon Opera” Transmission.** As follows from [18], this is the first opera in the Klingon language, and its intended destination was Arcturus, a type K1.5 III orange giant star, where live Klingons. No comments!

Michael Marshall also mentions the broadcast of the sci-fi movie **”The Day the Earth Stood Still”** to the star Alpha Centauri, rightly classifying this broadcast as intergalactic spamming, [19].

**«Отправка эмблемы Житомира в космос»** (“Sending the logo of Zhitomir in Space”), [20]. On September 12, 2009, Zhitomir City in Ukraine celebrated its 1,125th anniversary in the city's Cathedral Square. One of the many events as part of the celebration was to send the logo of Zhitomir into the cosmos. For this purpose the 70-m dish and power transmitter of Evpatoria Space Center was rented. In the evening on the big screen a live video of this broadcast was shown. However, it suddenly became clear that the Evpatoria antenna was not working that day and instead a demonstration video, which was shot in Evpatoria two weeks before, when the transmitter was turned off, was displayed on the screen.

The message **“Across the Universe”** (“NASA Beatles Transmission”) [21] was sent to the Pole Star, a supergiant whose surroundings are not suitable for any life; besides the message was compressed by "terrestrial" algorithms and transmitted with inappropriately high speed. It follows from a NASA news release and other official reports that the NASA Beatles Transmission was performed through the use of the 70-m DSS-63 antenna located in Robledo de Chavela (a suburb of Madrid, Spain), where one of three American deep space communications complexes is situated. A transmitter of an upward command radio link operating in the 4.2-cm band with an average power of 18 kW was used. The message was aimed at the North Star (known also as Polaris), which is 430 light years distant from us and whose planetary system, even if it exists, is not suited for the origin of life in accordance with the modern level of knowledge. The transmission rate was 128 kbps. Estimates obtained through the use of classical expression for range of radio communication, with the assumptions that Extraterrestrials possess an antenna identical to a square-kilometer array (SKA) antenna with an effective area of 1 sq. km and a receiving system with noise temperature of 20

Kelvin, show that the transmission rate is 300000 times higher than that required and that transmission of this song with a duration of 3.5 min at an admissible rate requires 750 days of continuous broadcasting, [4].

The above-mentioned facts—namely, usage of coding and consequent compression (which makes perception of the message by those who are not familiar with the Earth’s information technologies practically impossible,) the wrong choice of the star–addressee, and the unreasonably high transmission rate of the digital flow – apparently point to inefficiency of the NASA Beatles Transmission from the scientific point of view. Thus, the NASA Beatles Transmission may be considered a public-relations performance that was not substantiated from the scientific point of view and that, in contrast to the first musical radio message [4] beamed from Eupatoria in 2001, aimed only at publicity. Therefore, this project is a profanation of the idea of interstellar radio broadcasting.

Moreover, Stephane Dumas at his web site [22] recently reported about two unfamiliar interstellar radio messages: “**Message from Human Beings to the Universe (France), 1987**” (with Dumas’s remarks: “if someone has more information on this event, please contact me”) and “**Discovery Channel (Canada), 2005**”. Unfortunately, we could not find any mention of the preparation and implementation of these METI projects either in the press or on the Internet.

**Summarizing**, we would like to note that there is a clear and undoubted distinction between serious METI-projects and idle METI profanations. It is acceptable to assume that if most of the exo-civilizations satisfy the natural need for communication with other civilizations in such an unnatural and surrogate manner, it can cause the Great Silence. As was emphasized in [1], interstellar messaging represents a profound new kind of human activity – a purposeful effort to convert terrestrial civilizations from a listen-only mode into a civilization that could be detected from afar by probable extraterrestrial civilizations. We believe that it is now time to separate the scientifically-based messages from their frivolous counterparts. Such distinction will contribute to the development of IRM’s theory and practice, and help to avoid discrediting the real aims of “Messaging to Extra-Terrestrial Intelligence”.

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