

## Interstellar Music - by Mike Overly

Let's imagine that you could toss a message in a bottle faster than a speeding bullet into the cosmic ocean of outer space. What would you seal inside it for anyone, or anything, to open some day in the distant future, in a galaxy far, far away from our solar system? Well, imagine no more because it's been done! Thirty-five years ago, **NASA** launched two **Voyager** spacecraft carrying earthly images and sounds toward the Stars.

Voyager 1 was launched on September 5, 1977, from Cape Canaveral, Florida and Voyager 2 was sent on its way August 20 of that same year. Voyager 1 is now 11 billion miles away from earth and is the most distant of all human-made objects. Everyday, it flies another million miles farther.

In fact, Voyager 1 and 2 are so far out in space that their radio signals, traveling at the speed of light, take 16 hours to reach Earth. These radio signals are captured daily by the big dish antennas of the **Deep Space Network** and arrive at a strength of less than one **femtowatt**, a millionth of a billionth of a watt. Wow!

Both Voyagers are headed towards the outer boundary of the solar system, known as the **heliopause**. This is the region where the Sun's influence wanes and interstellar space waxes. Also, the heliopause is where the million-mile-per-hour solar winds slow down to about 250,000 miles per hour. The Voyagers have reached these solar winds, also known as termination shock, and should cross the heliopause in another 10 to 20 years. So, stay tuned.

The Voyagers have enough electrical power and thruster fuel to operate at least until 2020. By that time, Voyager 1 will be 12.4 billion miles from the Sun and Voyager 2 will be 10.5 billion miles away. Eventually, in about 40,000 years, Voyager 1 will pass within 1.6 light years of **AC+79 3888**, a star in the constellation of **Camelopardalis**. Then, in some 296,000 years, Voyager 2 will drift within 4.3 light years from **Sirius**, the brightest star in our earthly sky. So, it appears that the Voyagers are destined to traverse the **Milky Way**, and beyond, eternally. That is, unless they are abducted by an alien starship!

Each Voyager contains a **Golden Record** which serves as a time capsule, intended to communicate information about our world to extraterrestrials should they happen discover it. This information is recorded on a gold-plated copper phonograph disk, 12 inches in diameter. Each disk contains 115 analog encoded photographs, spoken greetings in 55 languages, and a 12 minute montage of natural sounds, such as surf, wind, thunder, birds and whales. These are included to portray the diversity of life and culture on earth. In addition, the Golden Record also includes an 87 and 1/2 minute selection of music ranging from Pygmy girls singing in a forest in Zaire to Chuck Berry's Johnny B. Goode! The contents of the Golden Record were selected for NASA by a committee chaired by **Dr. Carl Sagan** of Cornell University.

The audio portion of the Golden Record is designed to be played on a double-sided grooved phonograph disk at 16 and 2/3 revolutions per minute. This speed is diagrammatically defined in terms of the fundamental transition time of the hydrogen atom. Wow!

To enable playback, each record is encased in a protective aluminum jacket, which contains a ceramic phono cartridge and a needle, plus a diagram showing how to use them. These instructions also show a pulsar map illustrating earth's location at the time of launch and a patch of uranium-238, from whose half-life, the elapsed time since the launch may be calculated.

Although the playback technology is outdated, it has the advantage of longevity. As Iron Age **cuneiform** inscriptions remind us, grooves cut into a stable medium can last a long time. Therefore, the Golden Records should remain playable for at least a billion years before succumbing to erosion by micrometeorites and cosmic rays. And don't forget, a billion years is about 5,000 times longer than **Homo Sapiens** have existed... give or take a couple of years.

Now, here's something which I find to be a really sad characteristic of earthlings, but strangely enough, good news for the extraterrestrials. The copyright owners for the music on the Golden Records signed agreements which only permit the replay of their works outside of the solar system. So, here we are 35 years later, and finally the aliens can listen to the Golden Records

royalty free. Bonus!

One last thought. Just as choosing only one book to give an extraterrestrial a glimpse of our written language would certainly be a daunting task. Deciding on only one page within that book would be even more difficult. In the same way, choosing only a few songs to include on the Golden Record was a hard choice indeed! However, with that said, I have to wonder why, with all the music produced by humans on this earth, and given the Golden Record's limited amount of space: Why are there three examples of **Bach** and two of **Beethoven**? It seems to me that there should have been at least one **Beatle** song... oh well.

And now, without further adieu, here are humanity's 27 greatest hits that made the cut.

1. J. S. Bach, Brandenburg Concerto No. 2 in F, First Movement, Munich Bach Orchestra, Karl Richter, conductor. 4:40
2. Java, court gamelan, "Kinds of Flowers," recorded by Robert Brown. 4:43
3. Senegal, percussion, recorded by Charles Duvelle. 2:08
4. Zaire, Pygmy girls' initiation song, recorded by Colin Turnbull. 0:56
5. Australia, Aborigine songs, "Morning Star" and "Devil Bird," recorded by Sandra LeBrun Holmes. 1:26
6. Mexico, "El Cascabel," performed by Lorenzo Barcelata and the Mariachi México. 3:14
7. "Johnny B. Goode," written and performed by Chuck Berry. 2:38
8. New Guinea, men's house song, recorded by Robert MacLennan. 1:20
9. Japan, shakuhachi, "Tsuru No Sugomori" ("Crane's Nest,") performed by Goro Yamaguchi. 4:51
10. J. S. Bach, "Gavotte en Rondeaux" from the Partita No. 3 in E major for Violin, performed by Arthur Grumiaux. 2:55
11. W. A. Mozart, The Magic Flute, "Queen of the Night" aria, no. 14. Edda Moser, soprano. Bavarian State Opera, Munich, Wolfgang Sawallisch, conductor. 2:55
12. Georgian S.S.R., chorus, "Tchakrulo," collected by Radio Moscow. 2:18
13. Peru, panpipes and drum, collected by Casa de la Cultura, Lima. 0:52
14. "Melancholy Blues," performed by Louis Armstrong and his Hot Seven. 3:05
15. Azerbaijan S.S.R., bagpipes, recorded by Radio Moscow. 2:30
16. I. Stravinsky, Rite of Spring, "Sacrificial Dance," Columbia Symphony Orchestra, Igor Stravinsky, conductor. 4:35
17. J. S. Bach, The Well-Tempered Clavier, Book 2, Prelude and Fugue in C, No.1., Glenn Gould, piano. 4:48
18. L. van Beethoven, Fifth Symphony, First Movement, the Philharmonia Orchestra, Otto Klemperer, conductor. 7:20
19. Bulgaria, "Izlel je Delyo Hagdutin," sung by Valya Balkanska. 4:59
20. Navajo Indians, "Night Chant," recorded by Willard Rhodes. 0:57
21. Holborne, Paueans, Galliards, Almains and Other Short Aeirs, "The Fairie Round," performed by David Munrow and the Early Music Consort of London. 1:17
22. Solomon Islands, panpipes, collected by the Solomon Islands Broadcasting Service. 1:12
23. Peru, wedding song, recorded by John Cohen. 0:38
24. China, ch'in, "Flowing Streams," performed by Kuan P'ing-hu. 7:37
25. India, raga, "Jaat Kahan Ho," sung by Surshri Kesar Bai Kerkar. 3:30
26. "Dark Was the Night," written and performed by Blind Willie Johnson. 3:15
27. L. van Beethoven, String Quartet No. 13 in B flat, Opus 130, "Cavatina," performed by Budapest String Quartet. 6:37

Okay, it's now 2012, so I've got to ask the obligatory question: If you were to send your Golden Record into space today, what Interstellar Music would you included? <<http://voyager.jpl.nasa.gov/>>

'Til next time, have some **phonographic fun**... I'll be listening!

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*Globally-renowned guitar and bass instructor, **Mike Overly** easily combines the worlds of deeply-rooted academic study with a well-textured performance resume. His pathbreaking 12 Tone Music Publishing products, including the newly released "Tone Note® Music Method for Guitar," provide valuable illuminating insights while simplifying the learning process.*

Join Mike at [www.12tonemusic.com](http://www.12tonemusic.com) to explore and expand your knowledge of these two iconic instruments through a variety of reviews and interviews, tips and tricks and free lessons of remarkable originality, all presented in a family-friendly forum. Plus, as an added bonus, you get to follow Mr. Pick as he introduces you to fun fretboard games, jokes, riddles, quotes and more. Be sure to read the [12 Tone Music Blog](#) where Mike offers a behind-the-scenes look at the development of his unique approach to solving the problems of modern musical notation and traditional guitar and bass methods.

Mike Overly's unmatched perspective on fretboard education has something for everyone ~ from the amateur hobbyist to the serious professional player ~ as well as any music enthusiast who wants to come along for the ride.