

Ode to Happiness for Sunday January 24 2021

## Do You Think We're Alone?



NASA

*The center of the Milky Way, viewed by the Hubble space telescope in 2011. Scientists estimate there are some 300 million potentially habitable planets just in our own galaxy.*

It's 65 million light years to the other side of our galaxy; fewer than two hundred years since we produced the first signal that might alert others that we are here and ready to begin conversations with them. So even if the galactic woods are full of sentient beings, I wouldn't hold my breath waiting for a phone call.

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## **Sally Ride, 1st American Woman in Space, Dies at 61**

By Clara Moskowitz July 23, 2012



*The first U.S. woman in space, Sally Ride, monitors control panels from the pilot's chair on the Flight Deck of the STS-7 mission.*

NASA

Sally Ride, the first American woman to travel in space, has died at 61.

Ride had been fighting pancreatic cancer for 17 months and died peacefully, her company Sally Ride Science announced today (July 23). When she was 32, Ride blasted off on the STS-7 mission of the space shuttle Challenger, breaking through the highest glass ceiling for U.S. women to date.

During her historic mission, which deployed two communications satellites, Ride also became the first woman to use the shuttle's robotic arm in space.

Ride is survived by Tam O'Shaughnessy, her partner of 27 years, who also serves as chief operating officer and executive vice president of Sally Ride Science, a science outreach company Ride founded in 2001.

"Sally lived her life to the fullest, with boundless energy, curiosity, intelligence, passion, commitment, and love," Sally Ride Science officials said in statement. "Her integrity was absolute; her spirit was immeasurable; her approach to life was fearless."

Sally Ride was the third woman to travel to space, following Soviet cosmonauts Valentina Tereshkova in 1963 and Svetlana Savitskaya in 1982. She joined NASA in 1978 — one of 8,000 people to respond to a newspaper ad seeking space program applicants.

Only after her first spaceflight did she realize quite the impact she had had.

"It means a lot to me that my participation in that flight has meant so much to so many people," Ride told Florida Today on the 25th anniversary of her mission. "And I hadn't

appreciated how much it did really mean to people, how much it touched particularly women, until after my flight. The first few months after my flight I was really struck by the way that women of all ages — from college students to 60-year-old, 70-year-old, 80-year-old women — reacted to me. It was just something that they never thought they would see."

Ride received bachelor's, master's and doctorate degrees in physics from Stanford University.

Following her groundbreaking first spaceflight, Ride went on to fly in space once more, aboard the STS 41-G flight of Challenger in 1984. She spent a total of 343 hours in space.

Ride also played a role in two defining moments in NASA history, serving on the accident investigation boards set up in response to the tragic destruction of the space shuttles Challenger and Columbia and their crews in 1986 and 2003, respectively. In 2009, she served on the Augustine committee that helped shape NASA's new human spaceflight goals.



In 1987, Ride left NASA to work at the Stanford University Center for International Security and Arms Control, and later served as a professor of physics at the University of California, San Diego. From 1999 to 2000, she served as president of SPACE.com.

Ride was married from 1982 to 1987 to fellow astronaut Steven Hawley. She had no children; in addition to O'Shaughnessy, she is survived by her mother, Joyce; her sister, Bear; her niece, Caitlin, and her nephew, Whitney.

*[Sierra Hotel, lady. You showed what 'The Right Stuff' really meant]*

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## **Conundrums and Verities**

*Friend Jim Chapman, an astute observer of life had this to say on Thursday. He'll try and blame in on someone else, but don't believe him.*

A whale swims all day, only eats fish, and drinks water, but is still fat.

A rabbit runs and hops and only lives 15 years, while a tortoise doesn't run and does mostly nothing, yet it lives for 150 years. And they tell us to exercise? I don't think so.

Now that I'm older, here's what I've discovered:

1. I started out with nothing, and I still have most of it.
2. My wild oats are mostly enjoyed with prunes and all-bran.
3. Funny, I don't remember being absent-minded.
4. Funny, I don't remember being absent-minded.
5. If all is not lost, then where the heck is it?
6. It was a whole lot easier to get older than it was to get wiser.
7. Some days, you're the top dog, some days you're the hydrant.
8. I wish the buck really did stop here; I sure could use a few of them.
9. Kids in the backseat cause accidents.
10. Accidents in the back seat cause kids.
11. It is hard to make a comeback when you haven't been anywhere.
12. The world only beats a path to your door when you're in the bathroom.
13. If god wanted me to touch my toes, he'd have put them on my knees.
14. When I'm finally holding all the right cards, everyone wants to play chess.
15. It is not hard to meet expenses...they're everywhere.
16. The only difference between a rut and a grave is the depth.
17. These days, I spend a lot of time thinking about the hereafter. . .
- 17-a. I go somewhere to get something, and then wonder what I'm "here after".
18. Funny, I don't remember being absent-minded.
19. It is a lot better to be seen than viewed.
20. I don't suffer from insanity, I rather enjoy it.
21. Funny, I don't remember being absent-minded.

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## **2,500-Year-Old Temple to Greek Love Goddess Unearthed in Turkey**

By Patrick Pester – Live Science Staff Writer

The Greek goddess of love and fertility had a popular cult at the time.



*An example of Aphrodite temple ruins discovered in Turkey. The above site, the Temple of Aphrodite at Knidos, is different than the newly discovered temple, but has several similarities.  
(Image: © DEA/G. SIOEN/Contributor)*

An ancient temple used by cult followers of a Greek goddess has been found in western Turkey.

A team of Turkish researchers uncovered the 2,500-year-old temple honoring Aphrodite — the ancient Greek goddess of love, beauty, pleasure, passion and procreation — above ground on the Urla-Çeşme peninsula, Turkey's state-run Anadolu Agency reported earlier this month.

The team found a piece of a statue depicting a woman and a figure of a terracotta female head in the remains of the temple, which dates to the fifth century B.C. Around the temple is an inscription that reads, "This is the sacred area," research leader Elif Koparal, an archaeologist at Mimar Sinan Fine Arts University in Turkey, told the *Hürriyet Daily News*.

From the findings, Koparal and her team deduced that the ruins were the remains of a temple dedicated to Aphrodite and that there must have been a cult devoted to her in the region. "Aphrodite was a very common cult at that time," Koparal said.



Early Greek poet Hesiod wrote that Aphrodite was born from the white foam produced by the severed genital of Uranus, the personification of heaven, after his son Cronus threw them into the sea, according to Encyclopedia Britannica.

Although also worshipped as a goddess of the sea and even war, Aphrodite was primarily associated with love and fertility. Prostitutes considered Aphrodite their patron, and her public cult was very popular in ancient Greece.

The peninsula in present-day western Turkey where the temple was found is known for the ancient settlements and archaeological surveys that have been taking place there since 2006, according to the Hürriyet Daily News. In an "exciting find," Koparal and her team first discovered traces of the temple back in 2016, she told the Hürriyet Daily News.

"It is not common to find a temple during a surface survey," Koparal said. Surface surveys involve walking over the ground while recording, mapping and collecting artifacts encountered, according to the University of Michigan.

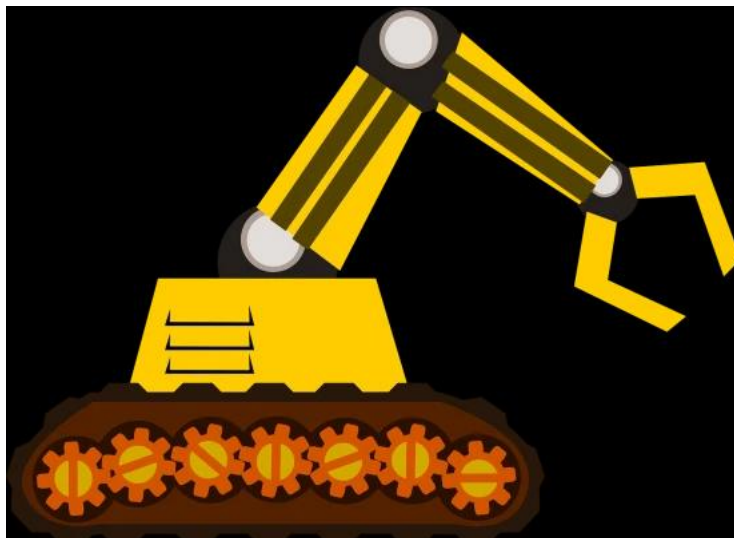
By searching an area of about 17,200 square feet (1,600 square meters) in this way, the team has found 35 prehistoric human settlements, including 16 dating to the Neolithic age, according to Anadolu Agency. Koparal told the agency that, thanks to this analysis, a significant social and economic network was discovered.

The temple and the rest of the historical sites will need to be protected from modern-day treasure hunters and urbanization. Koparal said the team is cooperating with the local people to help guard these archaeological treasures.

Originally published on Live Science.

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## **Robots Invade the Construction Site**



*Construction robot.*

Canvas, a company that has built a robot using artificial intelligence that's capable of drywalling, has almost as much artistry as a skilled human worker according to an article in Wired. The robot has been deployed at several construction sites in recent months, including the new Harvey Milk Terminal at San Francisco International Airport, and an office building in San Francisco.

The four-wheeled robot navigates an unfinished building carrying laser scanners and a robotic arm fitted to a vertical platform. When placed in a room, the robot scans the unfinished walls using LIDAR, then smooths the surface before applying a layer of drywall. Sensors help it steer clear of human workers.

According to Wired, Canvas is part of a boom in construction technology. Autonomous vehicles made by Volvo move materials and tools around some large sites. Technology from Built Robotics lets construction machinery operate autonomously. Robotic equipment can also take over specialized tasks such as welding, drilling, and brick-laying.

Doxel, based in Redwood City, California, makes a mobile robot that scans work sites so software can calculate how the project is progressing. A four-legged Boston Dynamites robot called Spot is being tested for the same purpose at a number of sites. Buildots, based in Tel Aviv, Israel, sells software that uses cameras fitted to the helmets of site managers, which automatically capture a site and process the images to identify discrepancies between plans and ongoing work.

A McKinsey report last month predicts a "big shakeout" across the construction industry over the next decade, with companies adopting technologies from the manufacturing world. The pandemic is accelerating the shift too, by making it more difficult to bring workers to a site.

Source: Built Robotics

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## Media Trust Hits New Low

Felix Salmon, author of Capital



Photo illustration: Sarah Grillo/Axios. Photo: Star Tribune via Getty Images

Trust in traditional media has declined to an all-time low, and many news professionals are determined to do something about it.



Why it matters: Faith in society's central institutions, especially in government and the media is the glue that holds society together. That glue was visibly dissolving a decade ago, and has now, for many millions of Americans, disappeared entirely.

By the numbers: For the first time ever, fewer than half of all Americans have trust in traditional media, according to data from Edelman's annual trust barometer shared exclusively with Axios. Trust in social media has hit an all-time low of 27%.

56% of Americans agree with the statement that "Journalists and reporters are purposely trying to mislead people by saying things they know are false or gross exaggerations."

58% think that "most news organizations are more concerned with supporting an ideology or political position than with informing the public."

When Edelman re-pollled Americans after the election, the figures had deteriorated even further, with 57% of Democrats trusting the media and only 18% of Republicans.

The big picture: These numbers are echoed across the rest of the world: They're mostly not a function of Donald Trump's war on "fake news".

As vaccine rumor hunter Heidi Larson puts it, "we don't have a misinformation problem, we have a trust problem."

News organizations have historically relied mainly on advertising income and as those dollars flow increasingly to Google and Facebook that has created institutional weakness that shows up in trust data.

Reversing the decline is a monster task — and one that some journalists and news organizations have taken upon themselves. They're going to need help — perhaps from America's CEOs.

The catch: Mistrust of media is now a central part of many Americans' personal identity — an article of faith that they weren't argued into and can't be argued out of.

What they're saying:

Former Financial Times editor Lionel Barber talks of factual reporting as a means of "regaining the trust of the reading public".

Axios has a stated mission to "help restore trust in fact-based news".

Washington Post media columnist Margaret Sullivan writes that "our goal should go beyond merely putting truthful information in front of the public. We should also do our best to make sure it's widely accepted."

How it works: Media outlets can continue to report reliable facts, but that won't turn the trend around on its own. What's needed is for trusted institutions to visibly embrace the news media.

CEOs (a/k/a the fourth branch of government) are at or near the top of Edelman's list of trusted institutions.

By the numbers: 61% of Trump voters say that they trust their employer's CEO. That compares to just 28% who trust government leaders, and a mere 21% who trust journalists.

The bottom line: CEOs have long put themselves forward as the people able to upgrade America's physical infrastructure. Now it's time for them to use the trust they've built up to help rebuild our civic infrastructure.

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## **Why Neanderthals Likely Fathered Few Kids with Modern Humans**

By Charles Q. Choi April 10, 2016

**[Just in case you've wondered]**

Neanderthals' Y chromosome may have kept males from successful interbreeding with modern human females.



(Image: © iurii / Shutterstock.com)

Humans today often carry around a small chunk of DNA from Neanderthals, suggesting we interbred with our closest known extinct relatives at some point in our history. So why isn't there more Neanderthal DNA in modern humans?

Turns out, the Y chromosome may have been key in keeping the two lineages apart by creating conditions that might often have led to miscarriages if or when the two got together, researchers now say.

Recent findings suggest that Neanderthals, who lived in Europe and Asia, may have died out about 40,000 years ago.

In 2010, scientists first sequenced the Neanderthal genome. That work revealed that Neanderthals once interbred with ancestors of modern humans — about 1.5 to 2.1 percent of the DNA of anyone outside Africa is Neanderthal in origin. [In Photos: Neanderthal Burials Uncovered]

The last major component of the Neanderthal genome that scientists had not analyzed was the Y chromosome. In modern humans and Neanderthals, the Y chromosome determines if someone is male in sex.

Now researchers have completed the first in-depth analysis of a Neanderthal Y chromosome. They focused on a Neanderthal male found in El Sidrón, Spain. Overall, the differences between the Neanderthal and modern human Y chromosomes suggest these lineages diverged almost 590,000 years ago, consistent with previous research.

The Neanderthal Y chromosome was genetically distinct from any seen in modern humans. This suggests that this El Sidrón male's lineage is extinct, without any living carriers in modern humans. It remains uncertain how much other Neanderthal Y chromosomes resembled or differed from this one.

Further analysis revealed that genetic mutations might explain why this Neanderthal Y chromosome was lost in modern humans. Three mutations seen on this chromosome generate molecules that can trigger immune responses from women during pregnancy that can lead to miscarriages, and two of these three mutations are unique to Neanderthals.

The researchers suggest that such genetic incompatibilities between Neanderthals and modern humans may have helped drive these lineages apart by discouraging interbreeding between them.

"We should pay attention to the potential role of immune incompatibilities in population isolation," study lead author Fernando Mendez, a population geneticist at Stanford University, told Live Science.

In future research, scientists could analyze more Y chromosomes from a variety of male Neanderthals, Mendez said. Lab experiments could then determine the effect of these newfound Neanderthal mutations on interactions between male cells and female immune cells. The result might also confirm the idea that these mutations helped keep Neanderthals and modern humans apart, he added.

Mendez and his colleagues detailed their findings in the April 7 issue of the American Journal of Human Genetics.

Follow Charles Q. Choi on Twitter @cqchoi. Follow us @livescience, Facebook&Google+. Original article on Live Science.

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**Watch as a WWII B-17 is Built**



*5,000<sup>th</sup> off the line*  
*fineartamerica.com*

<https://youtu.be/wPW1L9jUGSw>

Despite the rush to get the birds out the door, the Flying Fortresses were amazingly reliable. Here are a few of the people who made it happen

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## **Buster Keaton at His Indescribable Best**



<https://www.youtube.com/watch?v=frYIj2FGmMA>

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**Matthew Arnold (1822-1888)**



The English poet wrote of himself, mid-career:

My poems represent, on the whole, the main movement of mind of the last quarter of a century, and thus they will probably have their day as people become conscious to themselves of what that movement of mind is, and interested in the literary productions which reflect it.

It might be fairly urged that I have less poetical sentiment than Tennyson and less intellectual vigour and abundance than Browning; yet because I have perhaps more of a fusion of the two than either of them, and have more regularly applied that fusion to the main line of modern development, I am likely enough to have my turn as they have had theirs."

His literary career — leaving out two earlier prize poems — began in 1849 with the publication of *The Strayed Reveller and Other Poems* by A., which attracted little notice and was soon withdrawn. It contained what is perhaps Arnold's most purely poetical poem, "The Forsaken Mermaid." *Empedocles on Etna and Other Poems* (among them "Tristram and Iseult"), published in 1852, had a similar fate

His 1867 poem, "Dover Beach," depicted a nightmarish world from which the old religious verities have receded. It is sometimes held up as an early, if not the first, example of the modern sensibility.

## **Dover Beach**

**The sea is calm tonight.  
The tide is full, the moon lies fair  
Upon the straits; on the French coast, the light  
Gleams and is gone; the cliffs of England stand,  
Glimmering and vast, out in the tranquil bay.  
Come to the window, sweet is the night-air!  
Only, from the long line of spray  
Where the sea meets the moon-blanch'd land,**

**Listen! you hear the grating roar  
Of pebbles which the waves draw back, and fling,  
At their return, up the high strand,  
Begin, and cease, and then again begin,**

With tremulous cadence slow, and bring  
The eternal note of sadness in.

Sophocles long ago  
Heard it on the Aegean, and it brought  
Into his mind the turbid ebb and flow  
Of human misery; we  
Find also in the sound a thought,  
Hearing it by this distant northern sea.

The Sea of Faith  
Was once, too, at the full, and round earth's shore  
Lay like the folds of a bright girdle furled.  
But now I only hear  
Its melancholy, long, withdrawing roar,  
Retreating, to the breath  
Of the night-wind, down the vast edges drear  
And naked shingles of the world.

Ah, love, let us be true  
To one another! for the world, which seems  
To lie before us like a land of dreams,  
So various, so beautiful, so new,  
Hath really neither joy, nor love, nor light,  
Nor certitude, nor peace, nor help for pain;  
And we are here as on a darkling plain  
Swept with confused alarms of struggle and flight,  
Where ignorant armies clash by night.

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**Requiescat**

Strew on her roses, roses,  
And never a spray of yew.  
In quiet she reposes:  
Ah! would that I did too.

Her mirth the world required:  
She bathed it in smiles of glee.  
But her heart was tired, tired,  
And now they let her be.

Her life was turning, turning,  
In mazes of heat and sound.

**But for peace her soul was yearning,  
And now peace laps her round.**

**Her cabin'd, ample Spirit,  
It flutter'd and fail'd for breath.  
To-night it doth inherit  
The vasty hall of Death.**

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### **Aaron Copland (1900 –1990)**



American composer, composition teacher, writer, and later a conductor of his own and other American music, Copland was referred to by his peers and critics as "the Dean of American Composers".

The open, slowly changing harmonies in much of his music are typical of what many people consider to be the sound of American music, evoking the vast American landscape and pioneer spirit. He is best known for the works he wrote in the 1930s and 1940s in a deliberately accessible style often referred to as "populist" and which the composer labeled his "vernacular" style. Works in this vein include the ballets *Appalachian Spring*, *Billy the Kid and Rodeo*, his *Fanfare for the Common Man* and *Third Symphony*. In addition to his ballets and orchestral works, he produced music in many other genres, including chamber music, vocal works, opera and film scores.

During the late 1940s, Copland became aware that Stravinsky and other fellow composers had begun to study Arnold Schoenberg's use of twelve-tone (serial) techniques. After he had been exposed to the works of French composer Pierre Boulez, he incorporated serial techniques into his *Piano Quartet* (1950), *Piano Fantasy* (1957), *Connnotations for orchestra* (1961) and *Inscape for orchestra* (1967).

### **Fanfare for the Common Man**



[https://www.youtube.com/watch?v=0KxMc\\_tyQBo](https://www.youtube.com/watch?v=0KxMc_tyQBo)

The Presidents Own" U.S. Marine Band -- Fanfare for the Common Man

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### **Appalachian Spring**



<https://www.youtube.com/watch?v=Q4Qt0AIRK-0>

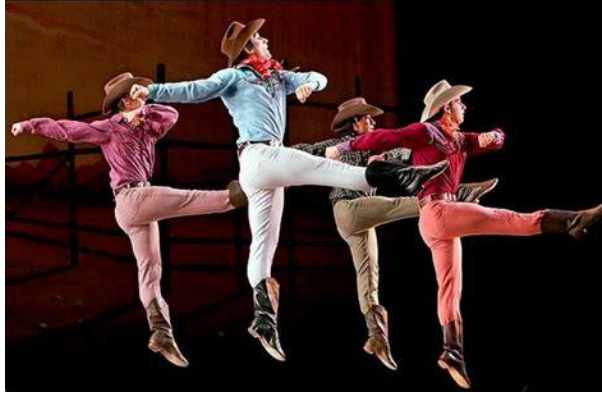
Performed by Eiji Oue & Minnesota Orchestra...

*[Over the years I've heard Simple Gifts played by many many orchestras, but this one has stood out to me. Why? Maybe because it is simpler than most of the others.]*

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### **Rodeo Ballet**





<https://www.youtube.com/watch?v=du4DrdGp9vM>

Zubin Mehta - Los Angeles Philharmonic Orchestra

- 00:00 1. Buckaroo Holiday
- 08:11 2. Corral Nocturne
- 15:35 3. Saturday Night Waltz
- 21:03 4. Hoe-Down

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## Safety

### Think Hands-Free Makes You Safe? Think Again

It's Past Time to Think About Cognitive Distraction

By NTSB Member Jennifer Homendy



When you think of common ways drivers are distracted on the road, you probably think of talking or texting on mobile devices, eating, reading, or perhaps even putting on makeup or shaving. It's easy to recognize that these risky behaviors are distractions. There are even laws on the books in several states that ban these sorts of distractions—particularly hand-held mobile phone use—so drivers know better than to do these things while driving (even if they do them on occasion anyway). Hands-free mobile phone use, on the other hand . . . that's okay, right?

Not so fast.

Distracted driving causes an alarming number of deaths and injuries on America's roads each year, and it has proven to be a hard problem to solve. Data from the National Highway Traffic Safety Administration say that 2,800 people died because of distracted driving in 2018 alone. And distraction is particularly dangerous for vulnerable road users; 400 pedestrians and 77 bicyclists were killed that year.

The United States has made huge improvements in reducing the number of deaths seen on our roadways since the 1960s and 1970s, but, over the past decade, we've stagnated in lowering the number of fatalities even further. We've greatly improved vehicle and road safety as well as seatbelt law adherence, and we've cut drunk driving deaths in half. But distracted driving continues to be an ever-problematic issue on our nation's roadways. Even my very own friends—knowing what I do for a living—have recently tried to have calls or video chats with me while they were driving!

Although, like all safety issues, we need to address distracted driving awareness and prevention year round, for 1 month each year, advocates turn up the focus. That's how critical it is to saving lives. Vice Chairman Landsberg recently wrote a blog in recognition of Distracted Driving Awareness Month. A few months ago, I wrote a blog about my own story of being in a crash caused by a distracted driver. I pointed out that, short of full cell phone bans, drivers can make hands-free calls through Bluetooth, which is still a cognitive distraction.

Why is that important?

A 2011 study detailed three types of distraction:

- Visual (taking your eyes off the road),
- Manual (taking your hands off the wheel to hold something, like food or a mobile device), and
- Cognitive (those distractions that cause a driver to take his or her mind off the primary task of driving safely, like making hands-free calls or even stressing about an important meeting).

Even when your eyes are on the road, simple cognitive distractions can impair your driving performance and diminish your reaction time. Many people don't realize that cognitive distractions while driving can be like driving while impaired—both reduce your ability to react.

Nearly a decade ago, the NTSB issued a recommendation to all 50 states and the District of Columbia, calling for a ban on all nonemergency use of portable electronic devices for all drivers, which would include prohibiting hands-free cell phone use. Ever since then, we have been advocating for states to ban cell phones while driving, and "Eliminate Distractions" has rightfully been on our Most Wanted List of transportation safety improvements since 2013. Although 48 states have banned texting while driving, no state has banned hands-free cell phone use.

The National Safety Council and AAA, along with others, remind us that hands-free isn't risk free. We need to think about and address cognitive distraction and its harmful consequences. When we're behind the wheel, let's make sure we keep our families and our roads safe by focusing on the primary task at hand—driving safely.

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## **Chuck Berry - Johnny B. Goode**



<https://www.youtube.com/watch?v=6ROwVrF0Ceg>

Charles Edward Anderson Berry (October 18, 1926 – March 18, 2017) was an American singer, songwriter and guitarist, and one of the pioneers of rock and roll music. Nicknamed the "Father of Rock and Roll", Berry refined and developed rhythm and blues into the major elements that made rock and roll distinctive with songs such as

"Maybellene" (1955), "Roll Over Beethoven" (1956), "Rock and Roll Music" (1957) and "Johnny B. Goode" (1958).

**Berry's "Johnny B. Goode" is the only rock-and-roll song included on the Voyager Golden Record**

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Be a knight  
Not a knave  
Caesar uses  
*Burma Shave!*

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## Sea Lions Surf Giant Waves



Pete Thomas

When an enormous swell slammed California last week, expert surfers took to the waves. But the true stars, it could be argued, were sea lions.

The accompanying footage shows California sea lions exhibiting remarkable prowess will riding and leaping through massive waves off Santa Barbara Island, west of Los Angeles.

The footage was captured by a documentary crew, which included a National Geographic cameraman, on a Jan. 7 Pacific Offshore Expeditions outing.

Ryan Lawler, who runs Pacific Offshore Expeditions, told [For The Win Outdoors](#) that the crew was hoping to capture underwater footage at a remote dive spot, but persistent fog led them on a search for a sunny patch.

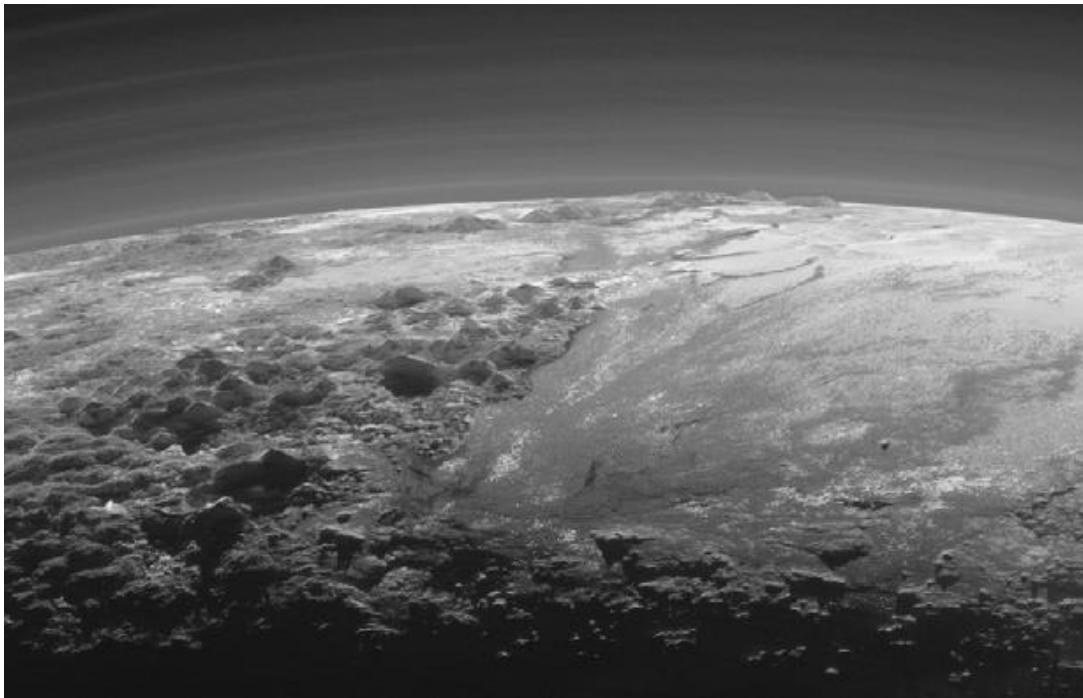
“On the exposed side of the island the swell was huge but we found some sun,” Lawler said. “As we rounded the southern portion of the island, which has an islet called Sutil Island, we noticed [sea lions flying out of the back of the waves](#). It was an awesome moment.

“I had never seen that before at this island, which is well known for its sea lions. So we stayed there for 20 minutes, observing and waiting for the sun to break up the fog. Then we dove for about 90 minutes and came back, but all the sea lions had disappeared.”

While sea lions are powerful swimmers and famously agile, scenes such as these are rarely observed. Lawler and the crew headed back to the island Thursday – as high surf continues – to try to capture drone footage of the same event.

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## A Plutonian Landscape



*Image Credit: NASA, Johns Hopkins Univ./APL, Southwest Research Institute*

This shadowy landscape of majestic mountains and icy plains stretches toward the horizon on a small, distant world. It was captured from a range of about 18,000 kilometers when New Horizons looked back toward Pluto, 15 minutes after the spacecraft's closest approach on July 14.

The dramatic, low-angle, near-twilight scene follows rugged mountains formally known as Norgay Montes from foreground left, and Hillary Montes along the horizon, giving way to smooth Sputnik Planum at right.

Layers of Pluto's tenuous atmosphere are also revealed in the backlit view. With a strangely familiar appearance, the frigid terrain likely includes ices of nitrogen and

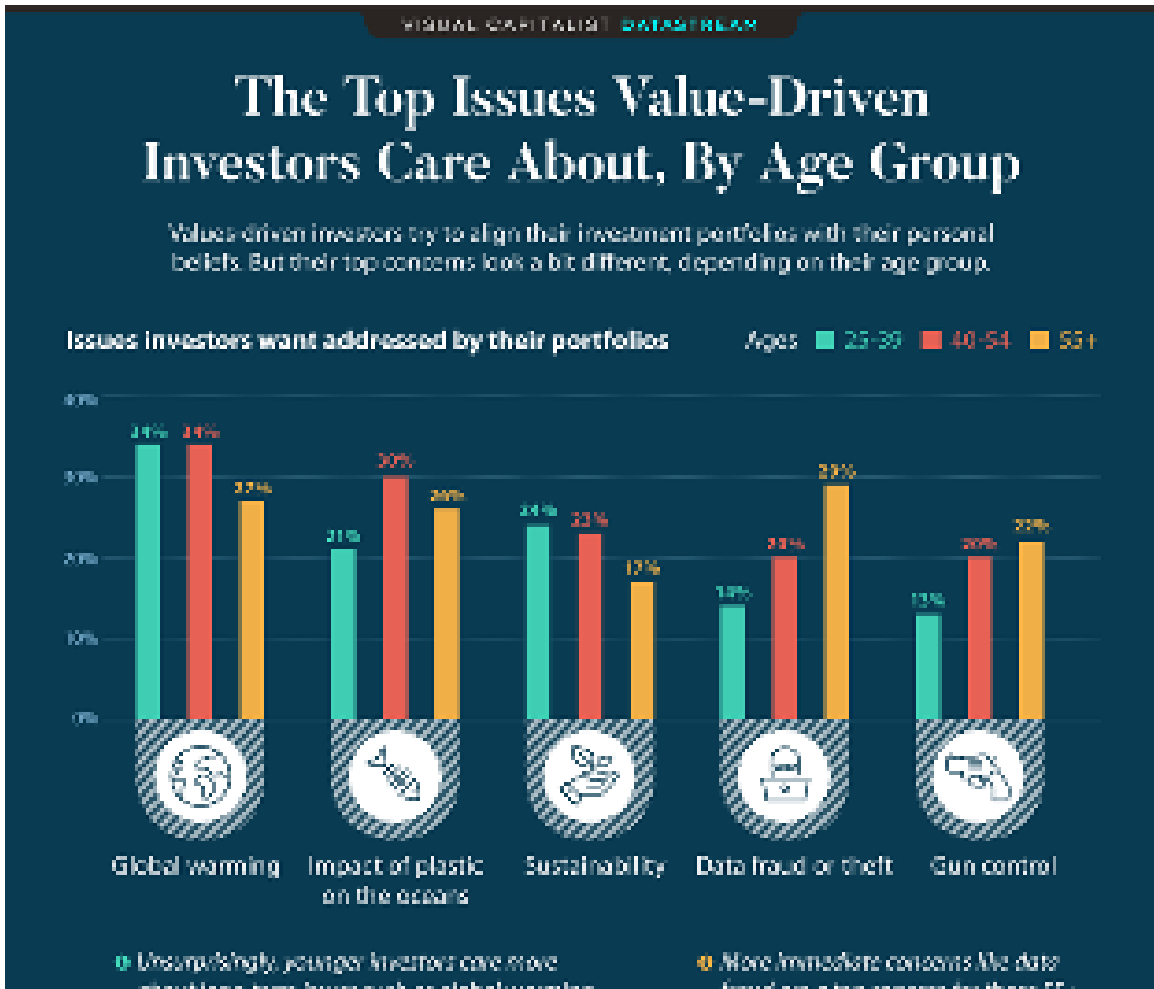
carbon monoxide with water-ice mountains rising up to 3,500 meters (11,000 feet). That's comparable in height to the majestic mountains of planet Earth. The Plutonian landscape is 380 kilometers (230 miles) across.

"Though thy crest be shorn and shaven, thou," I  
 said, "art sure no craven,  
 Ghastly grim and ancient Raven wandering from  
 the Nightly shore—  
 Tell me what thy lordly name is on the **Night's  
 Plutonian shore!**"  
 Quoth the Raven "Nevermore."

*Edgar Allen Poe, The Raven*

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### What Issues Do Values-Driven Investors Care About?



Contrary to popular belief, environmental, social, and governance (ESG) investing isn't just for the younger generation.

In fact, more than 80% of investors aged 40+ are interested in aligning their investment portfolios with their personal values, which is only around 10 percentage points less than the younger demographic (aged 25-39).

However, while overall intent to invest in the greater good is consistent across the board, the top concerns among investors vary, depending on age.

Here’s a look at the top issues that investors want addressed in their portfolios, by age group:

Age Group

<b>Issues</b>	<b>25-39</b>	<b>40-54</b>	<b>55+</b>
Global warming/ climate change	34%	34%	27%
Impact of plastic on the oceans	21%	30%	26%
Sustainability	24%	23%	17%
Data fraud or theft	14%	20%	29%
Gun control	13%	20%	22%

**Young Investors Care More About Long-Term Issues**

As the table above shows, the top concern among investors aged 25-39 is climate change, followed by sustainability in general.

This makes sense, considering that younger investors will most likely be around to deal with the consequences of long-term issues like climate change and plastic pollution.

In contrast, investors with a shorter time horizon to retirement (aged 55+) are more concerned with immediate threats like gun control and data fraud.

**How to Execute on Values-Driven Investments**

It’s clear that investors of all ages are interested in values-driven investing—but how can investors take action to build a portfolio that reflects their beliefs?

There are two approaches to building a sustainable investment portfolio:

- Exclusionary investing  
Also known as negative screening, or divesting. This is when investors screen out industries that go against their values, such as tobacco, gambling, or fossil fuels.
- Inclusionary investing  
Also known as positive screening. This is when investors formally consider ESG factors in their research process under the assumption that companies with strong sustainability practices can outperform their industry peers over time.

While exclusionary investing is the more common approach, research on the effectiveness of inclusionary investing has been overwhelmingly positive.

» For a more in-depth look on the top of values driven investing, read our full article [The Rise of the Values-Driven Investor](#)

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# Game Changers

## Global Village Possible

by David J. Whalen

*Folks, this is a bit long, but if you want to see where we've been in telecommunications (and where we might go) I think you'll find this to be a good primer...one to pass on to your descendants while such histories are available.*



In 500 years, when humankind looks back at the dawn of space travel, Apollo's landing on the Moon in 1969 may be the only event remembered. At the same time, however, Lyndon B. Johnson, himself an avid promoter of the space program, felt that reconnaissance satellites alone justified every penny spent on space. Weather forecasting has undergone a revolution because of the availability of pictures from geostationary meteorological satellites--pictures we see every day on television.

All of these are important aspects of the space age, but satellite communications has probably had more effect than any of the rest on the average person. Satellite communications is also the only truly commercial space technology- -generating billions of dollars annually in sales of products and services.

### **The Billion Dollar Technology**

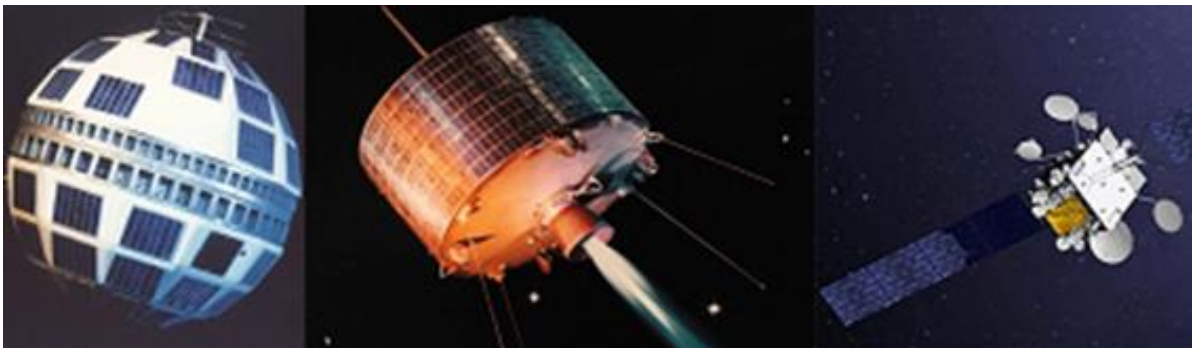
In fall of 1945 an RAF electronics officer and member of the British Interplanetary Society, Arthur C. Clarke, wrote a short article in *Wireless World* that described the use of manned satellites in 24-hour orbits high above the world's land masses to distribute television programs. His article apparently had little lasting effect in spite of Clarke's repeating the story in his 1951/52 *The Exploration of Space*. Perhaps the first person to carefully evaluate the various technical options in satellite communications and evaluate the financial prospects was John R. Pierce of AT&T's Bell Telephone Laboratories who, in a 1954 speech and 1955 article, elaborated the utility of a communications "mirror" in space, a medium-orbit "repeater" and a 24-hour-orbit "repeater." In comparing the communications capacity of a satellite, which he estimated at 1,000 simultaneous telephone calls, and the communications capacity of the first trans-Atlantic telephone cable (TAT-1), which could carry 36 simultaneous telephone



calls at a cost of 30-50 million dollars, Pierce wondered if a satellite would be worth a billion dollars.

After the 1957 launch of Sputnik I, many considered the benefits, profits, and prestige associated with satellite communications. Because of Congressional fears of "duplication," NASA confined itself to experiments with "mirrors" or "passive" communications satellites (ECHO), while the Department of Defense was responsible for "repeater" or "active" satellites which amplify the received signal at the satellite-- providing much higher quality communications. In 1960 AT&T filed with the Federal Communications Commission (FCC) for permission to launch an experimental communications satellite with a view to rapidly implementing an operational system.

The U.S. government reacted with surprise-- there was no policy in place to help execute the many decisions related to the AT&T proposal. By the middle of 1961, NASA had awarded a competitive contract to RCA to build a medium-orbit (4,000 miles high) active communication satellite (RELAY); AT&T was building its own medium-orbit satellite (TELSTAR) which NASA would launch on a cost-reimbursable basis; and NASA had awarded a sole-source contract to Hughes Aircraft Company to build a 24-hour (20,000 mile high) satellite (SYNCOM). The military program, ADVENT, was cancelled a year later due to complexity of the spacecraft, delay in launcher availability, and cost over-runs.

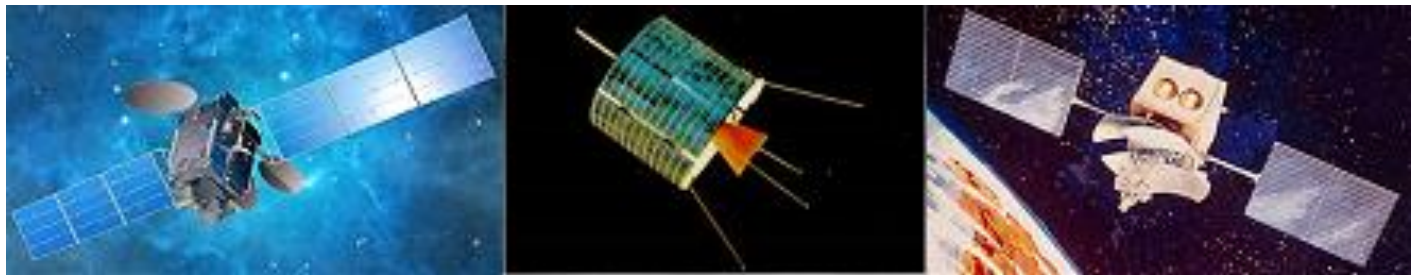


*TELSTAR SYNCOM and COMSAT*

By 1964, two TELSTARs, two RELAYs, and two SYNCOMs had operated successfully in space. This timing was fortunate because the Communications Satellite Corporation (COMSAT), formed as a result of the Communications Satellite Act of 1962, was in the process of contracting for their first satellite. COMSAT's initial capitalization of 200 million dollars was considered sufficient to build a system of dozens of medium-orbit satellites. For a variety of reasons, including costs, COMSAT ultimately chose to reject the joint AT&T/RCA offer of a medium-orbit satellite incorporating the best of TELSTAR and RELAY. They chose the 24-hour-orbit (geosynchronous) satellite offered by Hughes Aircraft Company for their first two systems and a TRW geosynchronous satellite for their third system. On April 6, 1965 COMSAT's first satellite, EARLY BIRD, was launched from Cape Canaveral. Global satellite communications had begun.

## **The Global Village: International Communications**

Some glimpses of the Global Village had already been provided during experiments with TELSTAR, RELAY, and SYNCOM. These had included televising parts of the 1964 Tokyo Olympics. Although COMSAT and the initial launch vehicles and satellites were American, other countries had been involved from the beginning. AT&T had initially negotiated with its European telephone cable "partners" to build earth stations for TELSTAR experimentation. NASA had expanded these negotiations to include RELAY and SYNCOM experimentation. By the time EARLY BIRD was launched, communications earth stations already existed in the United Kingdom, France, Germany, Italy, Brazil, and Japan. Further negotiations in 1963 and 1964 resulted in a new international organization, which would ultimately assume ownership of the satellites and responsibility for management of the global system. On August 20, 1964, agreements were signed which created the International Telecommunications Satellite Organization (INTELSAT).



*EARLY BIRD INTELSAT RCA SATCOM*

By the end of 1965, EARLY BIRD had provided 150 telephone "half- circuits" and 80 hours of television service. The INTELSAT II series was a slightly more capable and longer-lived version of EARLY BIRD. Much of the early use of the COMSAT/INTELSAT system was to provide circuits for the NASA Communications Network (NASCOM). The INTELSAT III series was the first to provide Indian Ocean coverage to complete the global network. This coverage was completed just days before one half billion people watched APOLLO 11 land on the moon on July 20, 1969.

From a few hundred telephone circuits and a handful of members in 1965, INTELSAT has grown to a present-day system with more members than the United Nations and the capability of providing hundreds of thousands of telephone circuits. Cost to carriers per circuit has gone from almost \$100,000 to a few thousand dollars. Cost to consumers has gone from over \$10 per minute to less than \$1 per minute. If the effects of inflation are included, this is a tremendous decrease! INTELSAT provides services to the entire globe, not just the industrialized nations.

### **Hello Guam: Domestic Communications**

In 1965, ABC proposed a domestic satellite system to distribute television signals. The proposal sank into temporary oblivion, but in 1972 TELESAT CANADA launched the first domestic communications satellite, ANIK, to serve the vast Canadian continental area. RCA promptly leased circuits on the Canadian satellite until they could launch their own satellite.

The first U.S. domestic communications satellite was Western Union's WESTAR I, launched on April 13, 1974. In December of the following year RCA launched their RCA SATCOM F- 1. In early 1976 AT&T and COMSAT launched the first of the COMSTAR series. These satellites were used for voice and data, but very quickly television became a major user. By the end of 1976 there were 120 transponders available over the U.S., each capable of providing 1500 telephone channels or one TV channel. Very quickly the "movie channels" and "super stations" were available to most Americans. The dramatic growth in cable TV would not have been possible without an inexpensive method of distributing video.

The ensuing two decades have seen some changes: Western Union is no more; Hughes is now a satellite operator as well as a manufacturer; AT&T is still a satellite operator, but no longer in partnership with COMSAT; GTE, originally teaming with Hughes in the early 1960s to build and operate a global system is now a major domestic satellite operator. Television still dominates domestic satellite communications, but data has grown tremendously with the advent of very small aperture terminals (VSATs). Small antennas, whether TV-Receive Only (TVRO) or VSAT are a commonplace sight all over the country.

### **New Technology**

The first major geosynchronous satellite project was the Defense Department's ADVENT communications satellite. It was three-axis stabilized rather than spinning. It had an antenna that directed its radio energy at the earth. It was rather sophisticated and heavy. At 500-1000 pounds it could only be launched by the ATLAS- CENTAUR launch vehicle. ADVENT never flew, primarily because the CENTAUR stage was not fully reliable until 1968, but also because of problems with the satellite. When the program was canceled in 1962 it was seen as the death knell for geosynchronous satellites, three-axis stabilization, the ATLAS-CENTAUR, and complex communications satellites generally. Geosynchronous satellites became a reality in 1963, and became the only choice in 1965. The other ADVENT characteristics also became commonplace in the years to follow.

In the early 1960s, converted intercontinental ballistic missiles (ICBMs) and intermediate range ballistic missiles (IRBMs) were used as launch vehicles. These all had a common problem: they were designed to deliver an object to the earth's surface, not to place an object in orbit. Upper stages had to be designed to provide a delta-Vee (velocity change) at apogee to circularize the orbit. The DELTA launch vehicles, which placed all of the early communications satellites in orbit, were THOR IRBMs that used the VANGUARD upper stage to provide this delta-Vee. It was recognized that the DELTA was relatively small and a project to develop CENTAUR, a high-energy upper stage for the ATLAS ICBM, was begun. ATLAS-CENTAUR became reliable in 1968 and the fourth generation of INTELSAT satellites used this launch vehicle. The fifth generation used ATLAS-CENTAUR and a new launch-vehicle, the European ARIANE. Since that time other entries, including the Russian PROTON launch vehicle and the Chinese LONG MARCH have entered the market. All are capable of launching satellites almost thirty times the weight of EARLY BIRD.

In the mid-1970s several satellites were built using three-axis stabilization. They were more complex than the spinners, but they provided more despun surface to mount antennas and they made it possible to deploy very large solar arrays. The greater the mass and power, the greater the advantage of three-axis stabilization appears to be. Perhaps the surest indication of the success of this form of stabilization was the switch of Hughes, closely identified with spinning satellites, to this form of stabilization in the early 1990s. The latest products from the manufacturers of SYNCOM look quite similar to the discredited ADVENT design of the late 1950s.

Much of the technology for communications satellites existed in 1960, but would be improved with time. The basic communications component of the satellite was the traveling-wave-tube (TWT). These had been invented in England by Rudolph Kompfner, but they had been perfected at Bell Labs by Kompfner and J. R. Pierce. All three early satellites used TWTs built by a Bell Labs alumnus. These early tubes had power outputs as low as 1 watt. Higher- power (50-300 watts) TWTs are available today for standard satellite services and for direct-broadcast applications. An even more important improvement was the use of high-gain antennas. Focusing the energy from a 1-watt transmitter on the surface of the earth is equivalent to having a 100-watt transmitter radiating in all directions. Focusing this energy on the Eastern U.S. is like having a 1000-watt transmitter radiating in all directions. The principal effect of this increase in actual and effective power is that earth stations are no longer 100-foot dish reflectors with cryogenically-cooled maser amplifiers costing as much as \$10 million (1960 dollars) to build. Antennas for normal satellite services are typically 15-foot dish reflectors costing \$30,000 (1990 dollars). Direct-broadcast antennas will be only a foot in diameter and cost a few hundred dollars.

### **Mobile Services**

In February of 1976 COMSAT launched a new kind of satellite, MARISAT, to provide mobile services to the United States Navy and other maritime customers. In the early 1980s the Europeans launched the MARECS series to provide the same services. In 1979 the UN International Maritime Organization sponsored the establishment of the International Maritime Satellite Organization (INMARSAT) in a manner similar to INTELSAT. INMARSAT initially leased the MARISAT and MARECS satellite transponders, but in October of 1990 it launched the first of its own satellites, INMARSAT II F-1. The third generation, INMARSAT III, has already been launched.

An aeronautical satellite was proposed in the mid-1970s. A contract was awarded to General Electric to build the satellite, but it was canceled--INMARSAT now provides this service. Although INMARSAT was initially conceived as a method of providing telephone service and traffic-monitoring services on ships at sea, it has provided much more. The journalist with a briefcase phone has been ubiquitous for some time, but the Gulf War brought this technology to the public eye.

The United States and Canada discussed a North American Mobile Satellite for some time. In the next year the first MSAT satellite, in which AMSC (U.S.) and TMI (Canada)

cooperate, will be launched providing mobile telephone service via satellite to all of North America.

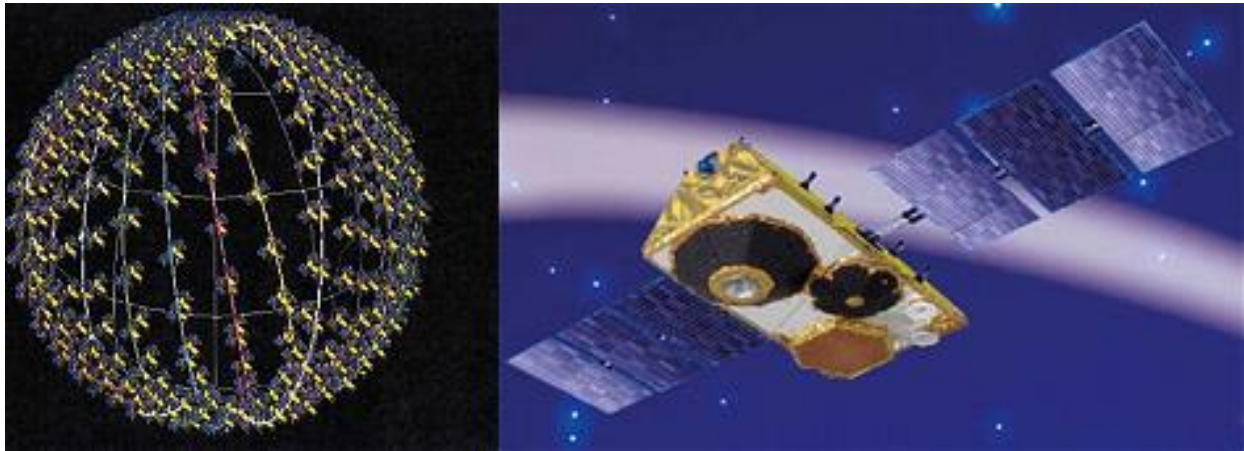
### **Competition**

In 1965, when EARLY BIRD was launched, the satellite provided almost 10 times the capacity of the submarine telephone cables for almost 1/10th the price. This price-differential was maintained until the laying of TAT-8 in the late 1980s. TAT-8 was the first fiber-optic cable laid across the Atlantic. Satellites are still competitive with cable for point-to-point communications, but the future advantage may lie with fiber-optic cable. Satellites still maintain two advantages over cable: they are more reliable and they can be used point-to-multi-point (broadcasting).

Cellular telephone systems have risen as challenges to all other types of telephony. It is possible to place a cellular system in a developing country at a very reasonable price. Long-distance calls require some other technology, but this can be either satellites or fiber-optic cable.

### The LEO Systems

Cellular telephony has brought us a new technological "system"-- the personal communications system (PCS). In the fully developed PCS, the individual would carry his telephone with him. This telephone could be used for voice or data and would be usable anywhere. Several companies have committed themselves to providing a version of this system using satellites in low earth orbits (LEO). These orbits are significantly lower than the TELSTAR/RELAY orbits of the early 1960s. The early "low-orbit" satellites were in elliptical orbits that took them through the lower van Allen radiation belt. The new systems will be in orbits at about 500 miles, below the belt.



*Iridium and Globalstar*

The most ambitious of these LEO systems is Iridium, sponsored by Motorola. Iridium plans to launch 66 satellites into polar orbit at altitudes of about 400 miles. Each of six orbital planes, separated by 30 degrees around the equator, will contain eleven satellites. Iridium originally planned to have 77 satellites-- hence its name. Element 66 has the less pleasant name Dysprosium. Iridium expects to be providing

communications services to hand-held telephones in 1998. The total cost of the Iridium system is well in excess of three billion dollars.

In addition to the "Big LEOS" such as Iridium and Globalstar, there are several "little Leos." These companies plan to offer more limited services, typically data and radio determination. Typical of these is ORBCOM which has already launched an experimental satellite and expects to offer limited service in the very near future.

### **Prospect and Retrospect**

Arthur C. Clarke's 1945 vision was of a system of three "manned" satellites located over the major land masses of the earth and providing direct-broadcast television. The inherent "broadcast" nature of satellite communications has made direct-broadcast a recurrent theme--yet one never brought to fruition. The problems are not technical--they are political, social, and artistic. What will people be willing to pay for? This is the question-- especially with the availability of 120-channel cable systems. Hughes is apparently about to enter this field and may encourage others to do the same. Only then will Clarke's prophetic vision be fulfilled.

There are currently six companies providing fixed satellite service to the U.S.: GE America, Alstom, AT&T, COMSAT, GTE, and Hughes Communications. They operate 36 satellites with a net worth of over four billion dollars. The ground stations that communicate with these satellites are innumerable and may have a similar net worth.

INTELSAT has had competition in the international market from Pan American Satellite since 1986. Orion Satellite is expected to begin international service in 1994. Since Canada began domestic satellite service in 1972, that country has been joined by the United States (1974), Indonesia (1976), Japan (1978), India (1982), Australia (1985), Brazil (1985), Mexico (1985), and many others.

Each year from 10-20 communications satellites are launched valued at about \$75 million each. The launch vehicles placing them in orbit have similar values. Both satellites and launch vehicles are multi-billion dollar businesses. The earth station business is equally large. Finally the communications services themselves are multi-billion dollar businesses. John R. Pierce was right--it would be worth a billion dollars.

### **A Selective Communications Satellite Chronology**

1945 Arthur C. Clarke Article: "Extra-Terrestrial Relays"

1955 John R. Pierce Article: "Orbital Radio Relays"

1956 First Trans-Atlantic Telephone Cable: TAT-1

1957 Sputnik: Russia launches the first earth satellite.

1960 1st Successful DELTA Launch Vehicle

1960 AT&T applies to FCC for experimental satellite communications license

1961 Formal start of TELSTAR, RELAY, and SYNCOM Programs

1962 TELSTAR and RELAY launched

1962 Communications Satellite Act (U.S.)

1963 SYNCOM launched

1964 INTELSAT formed

1965 COMSAT's EARLY BIRD: 1st commercial communications satellite  
1969 INTELSAT-III series provides global coverage  
1972 ANIK: 1st Domestic Communications Satellite (Canada)  
1974 WESTAR: 1st U.S. Domestic Communications Satellite  
1975 INTELSAT-IVA: 1st use of dual-polarization  
1975 RCA SATCOM: 1st operational body-stabilized comm. satellite  
1976 MARISAT: 1st mobile communications satellite  
1976 PALAPA: 3rd country (Indonesia) to launch domestic comm. satellite  
1979 INMARSAT formed.  
1988 TAT-8: 1st Fiber-Optic Trans-Atlantic telephone cable

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