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“Things had gone real well up to at that point of 55 hours, 54 minutes and 53 seconds (mission elapsed time),” said Apollo 13 astronaut Fred Haise as he recounted the evening of April 13, 1970, the night the Apollo 13’s command module’s oxygen tank exploded, crippling the spacecraft and endangering the three astronauts on board.

“Mission Control had asked for a cryo-stir in the oxygen tank ...and Jack threw the switches,” Haise continued. “There was a very loud bang that echoed through the metal hull, and I could hear and see metal popping in the tunnel [between the command module and the lunar lander]... There was a lot of confusion initially because the array of warning lights that were on didn’t resemble anything we have ever thought would represent a credible failure. It wasn’t like anything we were exposed to in the simulations.”

What followed was a four-day ordeal as Haise, Jim Lovell and Jack Swigert struggled to get back to Earth, as thousands of people back on Earth worked around the clock to ensure the astronauts’ safe return.

Haise described the moment of the explosion during an event in 2010 at the Smithsonian Air and Space Museum commemorating the 40th anniversary of the mission that’s been called a successful failure.

In 2010, Universe Today also commemorated the Apollo 13 anniversary with a series of articles titled “13 Things That Saved Apollo 13.” We looked at 13 different items and events that helped turn the failure into success, overcoming the odds to get the crew back home. We interviewed NASA engineer Jerry Woodfill, who helped design the alarm and warning light system for the Apollo program, which Haise described above.
Now, five years later on the 45th anniversary of Apollo 13, Woodfill returns with “13 MORE Things That Saved Apollo 13.” Over the next few weeks, we’ll look at 13 additional things that helped bring the crew home safely.

Woodfill has worked for NASA for almost 50 years as an engineer, and is one 27 people still remaining at Johnson Space Center who were also there for the Apollo program. In the early days of Apollo, Woodfill was the project engineer for the spacecraft switches, gauges, and display and control panels, including the command ship’s warning system.

On that night in April 1970 when the oxygen tank in Apollo 13’s command module exploded, 27-year-old Woodfill sat at his console in the Mission Evaluation Room (MER) at Johnson Space Center, monitoring the caution and warning system.

“It was 9:08 pm, and I looked at the console because it flickered a few times and then I saw a master alarm come on,” Woodfill said. “Initially I thought something was wrong with the alarm system or the instrumentation, but then I heard Jack Swigert in my headset: “Houston, we’ve had a problem,” and then a few moments later, Jim Lovell said the same thing.”

Located in an auxiliary building, the MER housed the engineers who were experts in the spacecrafts’ systems. Should an inexplicable glitch occur, the MER team could be consulted. And when alarms starting ringing, the MER team WAS consulted.

Woodfill has written a webpage detailing the difference between the MER and Mission Control (Mission Operations Control Room, or MOCR).

The ebullient and endearing Woodfill brings a wealth of knowledge — as well as his love for public outreach for NASA — to everything he does. But also, for the past 45 years he has studied the Apollo 13 mission in intricate detail, examining all the various facets of the rescue by going through flight transcripts, debriefs, and other documents, plus he’s talked to many other people who worked during the mission. Fascinated by the turn of events and individuals involved who turned failure into success, Woodfill has come up with 13 MORE things that saved Apollo 13, in addition to the original 13 he shared with us in 2010.

Woodfill tends to downplay both his role in Apollo 13 and the significance of the MER.

“In the MER, I was never involved or central to the main events which rescued Apollo 13,” Woodfill told Universe Today. “Our group was available for mission support. We weren’t flight controllers, but we were experts. For other missions that were routine we didn’t play that big of a role, but for the Apollo 13 mission, we did play a role.”

But Apollo Flight Director Gene Kranz, also speaking at the 2010 event at the Smithsonian Air and Space Museum, has never forgotten the important role the MER team played.

“The thing that was almost miraculous here [for the rescue], was I think to a great extent, the young controllers, particularly the systems guys who basically invented the discipline of what we now call systems engineering,” Kranz said. “The way these guys all learned their business, ... got to know the designs, the people and the spacecraft ... and they had to translate all that into useful materials that they could use on console in real time.”

Source: Universe Today

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2. The Solar System and Beyond is Awash in Water

As NASA missions explore our solar system and search for new worlds, they are finding water in surprising places. Water is but one piece of our search for habitable planets and life beyond Earth, yet it links many seemingly unrelated worlds in surprising ways.

"NASA science activities have provided a wave of amazing findings related to water in recent years that inspire us to continue investigating our origins and the fascinating possibilities for other worlds, and life, in the universe," said Ellen Stofan, chief scientist for the agency.

"In our lifetime, we may very well finally answer whether we are alone in the solar system and beyond."

The chemical elements in water, hydrogen and oxygen, are some of the most abundant elements in the universe. Astronomers see the signature of water in giant molecular clouds between the stars, in disks of material that represent newborn planetary systems, and in the atmospheres of giant planets orbiting other stars.

There are several worlds thought to possess liquid water beneath their surfaces, and many more that have water in the form of ice or vapor. Water is found in primitive bodies like comets and asteroids, and dwarf planets like Ceres. The atmospheres and interiors of the four giant planets -- Jupiter, Saturn, Uranus and Neptune -- are thought to contain enormous quantities of the wet stuff, and their moons and rings have substantial water ice.

Perhaps the most surprising water worlds are the five icy moons of Jupiter and Saturn that show strong evidence of oceans beneath their surfaces: Ganymede, Europa and Callisto at Jupiter, and Enceladus and Titan at Saturn.

Scientists using NASA's Hubble Space Telescope recently provided powerful evidence that Ganymede has a saltwater, sub-surface ocean, likely sandwiched between two layers of ice.

Europa and Enceladus are thought to have an ocean of liquid water beneath their surface in contact with mineral-rich rock, and may have the three ingredients needed for life as we know it: liquid water, essential chemical elements for biological processes, and sources of energy that could be used by living things. NASA's Cassini mission has revealed Enceladus as an active world of icy geysers. Recent research suggests it may have hydrothermal activity on its ocean floor, an environment potentially suitable for living organisms.

NASA spacecraft have also found signs of water in permanently shadowed craters on Mercury and our moon, which hold a record of icy impacts across the ages like cryogenic keepsakes.

While our solar system may seem drenched in some places, others seem to have lost large amounts of water.

On Mars, NASA spacecraft have found clear evidence that the Red Planet had water on its surface for long periods in the distant past. NASA's Curiosity Mars Rover discovered an ancient streambed that existed amidst conditions favorable for life as we know it.

More recently, NASA scientists using ground-based telescopes were able to estimate the amount of water Mars has lost over the eons. They concluded the planet once had enough liquid water to form an ocean occupying...
almost half of Mars' northern hemisphere, in some regions reaching depths greater than a mile (1.6 kilometers). But where did the water go?

It's clear some of it is in the Martian polar ice caps and below the surface. We also think much of Mars' early atmosphere was stripped away by the wind of charged particles that streams from the sun, causing the planet to dry out. NASA's MAVEN mission is hard at work following this lead from its orbit around Mars.

The story of how Mars dried out is intimately connected to how the Red Planet's atmosphere interacts with the solar wind. Data from the agency's solar missions -- including STEREO, Solar Dynamics Observatory and the planned Solar Probe Plus -- are vital to helping us better understand what happened.

Understanding the distribution of water in our solar system tells us a great deal about how the planets, moons, comets and other bodies formed 4.5 billion years ago from the disk of gas and dust that surrounded our sun. The space closer to the sun was hotter and drier than the space farther from the sun, which was cold enough for water to condense. The dividing line, called the "frost line," sat around Jupiter's present-day orbit. Even today, this is the approximate distance from the sun at which the ice on most comets begins to melt and become "active." Their brilliant spray releases water ice, vapor, dust and other chemicals, which are thought to form the bedrock of most worlds of the frigid outer solar system.

Scientists think it was too hot in the solar system's early days for water to condense into liquid or ice on the inner planets, so it had to be delivered -- possibly by comets and water-bearing asteroids. NASA's Dawn mission is currently studying Ceres, which is the largest body in the asteroid belt between Mars and Jupiter. Researchers think Ceres might have a water-rich composition similar to some of the bodies that brought water to the three rocky, inner planets, including Earth.

The amount of water in the giant planet Jupiter holds a critical missing piece to the puzzle of our solar system's formation. Jupiter was likely the first planet to form, and it contains most of the material that wasn't incorporated into the sun. The leading theories about its formation rest on the amount of water the planet soaked up. To help solve this mystery, NASA's Juno mission will measure this important quantity beginning in mid-2016.

Looking further afield, observing other planetary systems as they form is like getting a glimpse of our own solar system's baby pictures, and water is a big part of that story. For example, NASA's Spitzer Space Telescope has observed signs of a hail of water-rich comets raining down on a young solar system, much like the bombardment planets in our solar system endured in their youth.

With the study of exoplanets -- planets that orbit other stars -- we are closer than ever to finding out if other water-rich worlds like ours exist. In fact, our basic concept of what makes planets suitable for life is closely tied to water: Every star has a habitable zone, or a range of distances around it in which temperatures are neither too hot nor too cold for liquid water to exist. NASA's planet-hunting Kepler mission was designed with this in mind. Kepler looks for planets in the habitable zone around many types of stars.

Recently verifying its thousandth exoplanet, Kepler data confirm that the most common planet sizes are worlds just slightly larger than Earth. Astronomers think many of those worlds could be entirely covered by deep oceans. Kepler's successor, K2, continues to watch for dips in starlight to uncover new worlds.

The agency's upcoming TESS mission will search nearby, bright stars in the solar neighborhood for Earth- and super-Earth-sized exoplanets. Some of the planets TESS discovers may have water, and NASA's next great space observatory, the James Webb Space Telescope, will examine the atmospheres of those special worlds in great detail.
It's easy to forget that the story of Earth's water, from gentle rains to raging rivers, is intimately connected to the larger story of our solar system and beyond. But our water came from somewhere -- every world in our solar system got its water from the same shared source. So it's worth considering that the next glass of water you drink could easily have been part of a comet, or an ocean moon, or a long-vanished sea on the surface of Mars. And note that the night sky may be full of exoplanets formed by similar processes to our home world, where gentle waves wash against the shores of alien seas.

Source: JPL

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**Top NASA Scientist: We'll Find Signs of Alien Life 'Within a Decade'**

Humanity is on the verge of discovering alien life, high-ranking NASA scientists say.

"I think we're going to have strong indications of life beyond Earth within a decade, and I think we're going to have definitive evidence within 20 to 30 years," NASA chief scientist Ellen Stofan said Tuesday (April 7) during a panel discussion that focused on the space agency's efforts to search for habitable worlds and alien life.

"We know where to look. We know how to look," Stofan added during the event, which was webcast live. "In most cases we have the technology, and we're on a path to implementing it. And so I think we're definitely on the road." [5 Bold Claims of Alien Life]

Former astronaut John Grunsfeld, associate administrator for NASA's Science Mission Directorate, shared Stofan's optimism, predicting that signs of life will be found relatively soon both in our own solar system and beyond.

"I think we're one generation away in our solar system, whether it's on an icy moon or on Mars, and one generation [away] on a planet around a nearby star," Grunsfeld said during Tuesday's event.

Recent discoveries suggest that the solar system and broader Milky Way galaxy teem with environments that could support life as we know it, Grunsfeld said.

For example, oceans of liquid water slosh beneath the icy shells of the Jupiter moons Europa and Ganymede, as well as that of the Saturn satellite Enceladus. Oceans covered much of Mars in the ancient past, and seasonal dark streaks observed on the Red Planet's surface today may be caused by salty flowing water.

Further, NASA's Curiosity rover has found carbon-containing organic molecules and "fixed" nitrogen, basic ingredients necessary for Earth-like life, on the Martian surface.

Farther afield, observations by NASA's Kepler space telescope suggest that nearly every star in the sky hosts planets — and many of these worlds may be habitable. Indeed, Kepler's work has shown that rocky worlds like Earth and Mars are probably more common throughout the galaxy than gas giants such as Saturn and Jupiter.

Source: NBC News
SpaceX is gearing up for a second attempt to land the spent first stage of a Falcon 9 rocket on a drone ship in the Atlantic Ocean. Liftoff is scheduled for Monday, April 13 at 4:33 p.m. EDT (19:33 UTC) from Cape Canaveral Air Force Station in Florida. The Falcon's primary mission is sending a cargo-laden Dragon spacecraft to the International Space Station. After the first stage finishes its job, the second stage and Dragon will power onward while the first stage comes in for a controlled landing on a thruster-powered spaceport.

The private spaceflight company first tried this in January. During that attempt, the set of deployable grid fins used to steer the rocket ran out of hydraulic fluid. The vehicle came in at a sharp angle, smashing into the drone ship with a fiery crash. In typical SpaceX fashion, footage of the mishap was released on social media via Vine.

SpaceX intended to go for it again in February, during the launch of the Deep Space Climate Observatory, DSCOVR. But high waves and a faulty drone ship thruster scrubbed the attempt. According to CEO Elon Musk, the spent booster still soft-landed on target amidst violent sea swells within 10 meters of its target, before toppling into the waves. Musk also said the drone ship was being upgraded to handle "literally anything." Since then, the ship's two support vessels have been tracked in and around Port Canaveral and the Port of Jacksonville, according to the ship tracking service MarineTraffic.

The Autonomous Spaceport Drone Ship, as SpaceX calls it, has been christened the "Just Read the Instructions"—and the name is now emblazoned on the landing deck. The moniker is a reference to a ship
from the late Iain M. Banks’ novel "The Player of Games." Another drone ship, under construction for launches out of Vandenberg Air Force Base in California, will be dubbed "Of Course I Still Love You," Musk said.

The process for landing the Falcon 9 on Just Read the Instructions works like this: Following first stage separation, thrusters flip the rocket so the engines are pointing in the direction of travel. First, there’s a boostback burn to refine the rocket’s trajectory, causing the rocket to fly through its own exhaust (the space shuttle's risky Return-to-Launch-Site abort scenario relied on a similar maneuver). While the vehicle is still traveling faster than the speed of sound, four grid fins deploy, steering the rocket as it plummets toward the ocean. An entry burn slows the rocket further, and landing legs unfold. A final engine burn settles the Falcon onto Just Read the Instructions.

At least, that’s how things are supposed to work.

Meanwhile, the Falcon’s second stage, powered by a single cryogenic engine, will boost Dragon into its initial orbit. Assuming an on-time launch, Dragon will arrive at the station Wednesday. At 7:00 a.m. EDT, European Space Agency astronaut Samantha Cristoforetti and NASA's Terry Virts will grapple the spacecraft with the station’s robotic arm. It will be installed at the Earth-facing Harmony port a couple hours later.

Dragon is loaded with about two tons of supplies. The last Dragon to berth with the station carried about 1.8 tons of pressurized cargo, according to NASA ISS Program Manager Mike Suffredini. That makes Monday’s flight the beefiest Dragon haul to date.

The cargo aboard Dragon includes scientific experiments and supplies that will be used to support Expeditions 43 and 44, which last through September. Two crew members, Scott Kelly and Mikhail Kornienko, are currently aboard the station for a one-year mission. Their Soyuz spacecraft will be swapped out in September, following the arrival of cosmonaut Sergey Volkov. Volkov will arrive with ESA astronaut Andreas Mogensen and space tourist Sarah Brightman. Mogensen and Brightman will return to Earth with cosmonaut Gennady Padalka in the initial Kelly-Kornienko Soyuz.

Source: The Planetary Society
The Night Sky

Friday, April 10
Look for the Pleiades just 3° to the upper right of Venus during and after late twilight. That's about two finger-widths at arm's length. Upper left of Venus by 13° is 1st-magnitude Aldebaran, an orange-yellow firespark.

Saturday, April 11
The Pleiades are closest to Venus this evening: about 2½° to its right as twilight fades away in the west, as shown here.

Last-quarter Moon tonight (exact at 11:44 p.m. EDT). The Moon rises around 2 a.m. Sunday morning daylight-saving time or even a bit later. It shines to the left of the Sagittarius Teapot through the rest of Sunday's early-morning hours.

Sunday, April 12
With the Moon out of the evening sky, see if you can spot the big, soft Beehive Star Cluster (M44) in central Cancer with your unaided eyes. Bright Jupiter guides the way; after nightfall, M44 is to the right of Jupiter by 5° (about three finger-widths at arm's length). Is your sky too light-polluted? Binoculars bring it right out.

Binoculars will also show Cancer's second open cluster, M67, much smaller and dimmer but still a fairly easy find. And in northern Cancer are two fine binocular double stars. See Gary Seronik’s Binocular Highlight column and chart in the April Sky & Telescope, page 45.

Monday, April 13
Now Venus stands smack on the line from the Pleiades to Aldebaran, less than a third of the way from the former to the latter.

Io eclipses Europa among Jupiter’s moons. Io’s shadow falls on Europa from 9:29 to 9:33 p.m. Eastern Daylight Time. At the middle of this time, Europa will dim by a very obvious 2.3 magnitudes.

Now that Jupiter is far from opposition, we see shadows in the Jovian system falling far enough sideways that an eclipsed satellite and its eclipser appear widely separated in a telescope’s view. So we can see the eclipsed satellite dimming by itself, uncontaminated by the light of the eclipser. (The tables in Sky & Telescope for these events presume that the two satellites appear blended and give their combined magnitude.)

Tuesday, April 14
After dark as spring advances, the Big Dipper high in the northeast is tipping over as if to dump water into the dim Little Dipper’s bowl, which is swinging up far below it.

Late tonight an 8.9-magnitude star near Spica will be occulted by the fainter asteroid 595 Polyxena for telescope users along a path from Maine through southern Ontario, Michigan, Nebraska, and northern California. The star should vanish for up to 8 seconds around 7:29 Universal Time for Maine, and 7:34 UT at the West Coast. Path map and finder charts for the star.

Source: Sky & Telescope
ISS Sighting Opportunities

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Sighting information for other cities can be found at NASA’s [Satellite Sighting Information](https://www.nasa.gov).  

NASA-TV Highlights  
(all times Eastern Daylight Time)

**8:30 a.m., Saturday, April 11** - Coverage of NASA’s Student Launch Initiative (NTV-1 (Public), NTV-2 (Education))

**1:30 p.m., Sunday, April 12** - ISS Science, Research and Technology Panel (all channels)

**3:30 p.m., Sunday, April 12** - ISS National Lab Panel – KSC (all channels)

**5 p.m., Sunday, April 12** - SpaceX Pre-Launch News Conference – KSC (undefined, NTV-1 (Public), NTV-2 (Education), NTV-3 (Media))

**3:30 p.m., Monday, April 13** - Coverage of the Launch of the SpaceX/Falcon 9 CRS-6 Mission to the ISS (all channels)

**6 p.m., Monday, April 13** - SpaceX CRS-6 Post-Launch News Conference – KSC (all channels)

Watch NASA TV on the Net by going to the [NASA website](https://www.nasa.gov).
Space Calendar

- Apr 10 - Comet P/2010 P4 (WISE) At Opposition (4.086 AU)
- Apr 10 - Royal Astronomical Society Ordinary Meeting, London, United Kingdom
- Apr 10 - Meeting: Accretion States and Feedback (AGN), London, United Kingdom
- Apr 10-12 - International Space Apps Challenge
- Apr 11 - Comet P/2010 P4 (WISE) At Opposition (4.086 AU)
- Apr 10 - Royal Astronomical Society Ordinary Meeting, London, United Kingdom
- Apr 10 - Meeting: Accretion States and Feedback (AGN), London, United Kingdom
- Apr 11 - Comet C/2013 V5 (Oukaimeden) At Opposition (2.317 AU)
- Apr 11 - Comet 243P/NEAT At Opposition (4.173 AU)
- Apr 11 - Comet C/2014 G1 (PANSTARRS) Closest Approach To Earth (5.668 AU)
- Apr 11 - Cassini, Distant Flyby of Titan, Tethys & Dione
- Apr 11 - Comet C/2013 H2 (Boattini) Closest Approach To Earth (7.331 AU)
- Apr 11 - Asteroid 2015 FL Near-Earth Flyby (0.051 AU)
- Apr 11 - Asteroid 2675 Tolkien Closest Approach To Earth (1.432 AU)
- Apr 11 - Asteroid 3313 Mendel Closest Approach To Earth (1.497 AU)
- Apr 11 - 45th Anniversary (1970), Apollo 13 Launch
- Apr 12 - Yuri’s Night - World Space Party
- Apr 12 - Comet 253P/PANSTARRS At Opposition (3.891 AU)
- Apr 12 - Asteroid 2005 KA Near-Earth Flyby (0.033 AU)
- Apr 12 - Asteroid 2015 FQ Near-Earth Flyby (0.070 AU)
- Apr 12 - Asteroid 2015 EL7 Near-Earth Flyby (0.086 AU)
- Apr 12 - Asteroid 787 Moskva Closest Approach To Earth (1.626 AU)
- Apr 12 - Asteroid 3905 Doppler Closest Approach To Earth (1.933 AU)
- Apr 12 - Dwarf Planet 136108 Haumea At Opposition (49.831 AU)
- Apr 12 - 30th Anniversary (1985), STS-51-D Launch (Space Shuttle Discovery, Senator Jake Garn)
- Apr 13 - CRS-6/ AggieSat 4/ Bevo 2/ Flock-1E 1-28/ Arkyd-3 Reflight Falcon 9 Launch (International Space Station)
- Apr 13 - Comet C/2014 N2 (PANSTARRS) At Opposition (2.350 AU)
- Apr 13 - Comet P/2012 WA34 (Lemmon-PANSTARRS) At Opposition (3.944 AU)
- Apr 13 - Asteroid 2015 FG36 Near-Earth Flyby (0.060 AU)
- Apr 13 - Asteroid 3524 Schulz Closest Approach To Earth (1.411 AU)
- Apr 13 - Asteroid 3255 Tholen Closest Approach To Earth (2.119 AU)
- Apr 13 - Asteroid 1143 Odysseus Closest Approach To Earth (4.331 AU)
- Apr 13 - 55th Anniversary (1960), Transit 1B Launch (1st Experimental Navigation Satellite)
- Apr 13 - Richard Assmann's 170th Birthday (1845)
- Apr 13 - Bruno Rossi's 110th Birthday (1905)
- Apr 14 - MESSENGER, Orbital Change Maneuver 16 (OCM-16)
- Apr 14 - Comet C/2012 K8 (Lemmon) At Opposition (6.437 AU)
- Apr 14 - Asteroid 2 Pallas Occults TYC 1558-01453-1 (8.6 Magnitude Star)
- Apr 14 - Asteroid 1041 Asta Occults HIP 25291 (5.9 Magnitude Star)
- Apr 14 - Asteroid 11311 Peleus Closest Approach To Earth (1.913 AU)
- Apr 14 - Asteroid 5254 Ulysses Closest Approach To Earth (4.769 AU)
- Apr 14 - Luigi Carnera’s 140th Birthday (1875)

Source: JPL Space Calendar
Researchers from several institutions are in the Four Corners region of the U.S. Southwest with a suite of airborne and ground-based instruments, aiming to uncover reasons for a mysterious methane "hot spot" detected from space.

"With all the ground-based and airborne resources that the different groups are bringing to the region, we have the unique chance to unequivocally solve the Four Corners mystery," said Christian Frankenberg, a scientist at NASA's Jet Propulsion Laboratory, Pasadena, California, who is heading NASA's part of the effort. Other investigators are from the Cooperative Institute for Research in Environmental Sciences (CIRES) in Boulder, Colorado; the National Oceanic and Atmospheric Administration (NOAA); and the University of Michigan, Ann Arbor.

Last fall, researchers including Frankenberg reported that a small region around the Four Corners intersection of Arizona, Colorado, New Mexico and Utah had the highest concentration of methane over background levels of any part of the United States. An instrument on a European Space Agency satellite measuring greenhouse gases showed a persistent atmospheric hot spot in the area between 2003 and 2009. The amount of methane observed by the satellite was much higher than previously estimated.

The satellite observations were not detailed enough to reveal the actual sources of the methane in the Four Corners. Likely candidates include venting from oil and gas activities, which are primarily coalbed methane exploration and extraction in this region; active coal mines; and natural gas seeps.

Researchers from CIRES, NOAA's Earth Systems Research Laboratory and Michigan are conducting a field campaign called TOPDOWN (Twin Otter Projects Defining Oil Well and Natural gas emissions) 2015, bringing airborne and ground-based instruments to investigate possible sources of the methane hot spot. The JPL team
will join the effort on April 17-24. The groups are coordinating their measurements, but each partner agency will deploy its own suite of instruments.

The JPL participants will fly two complementary remote sensing instruments on two Twin Otter research aircraft. The Next-Generation Airborne Visible/Infrared Imaging Spectrometer (AVIRISng), which observes spectra of reflected sunlight, flies at a higher altitude and will be used to map methane at fine resolution over the entire region. Using this information and ground measurements from the other research teams, the Hyperspectral Thermal Emission Spectrometer (HyTES) will fly over suspected methane sources, making additional, highly sensitive measurements of methane. Depending on its flight altitude, the NASA aircraft can image methane features with a spatial resolution better than three feet (one meter) square. In other words, it can create a mosaic showing how methane levels vary every few feet, enabling the identification of individual sources.

With the combined resources, the investigators hope to quantify the region's overall methane emissions and pinpoint contributions from different sources. They will track changes over the course of the month-long effort and study how meteorology transports emissions through the region.

"If we can verify the methane detected by the satellite and identify its sources, decision-makers will have critical information for any actions they are considering," said CIRES scientist Gabrielle Pétron, one of the mission's investigators. Part of President Obama's recent Climate Action Plan calls for reductions in methane emissions.

Besides the groups mentioned above, the research team also includes scientists from the Institute of Arctic and Alpine Research at the University of Colorado, Boulder; the U.S. Bureau of Land Management; and the state of New Mexico. The California Institute of Technology in Pasadena manages JPL for NASA.

Source: JPL
Space Image of the Week

In the Heart of the Virgo Cluster

Image Credit: NASA/ESA/ESO/NAOJ/G. Paglioli; Copyright: R. Colombari/G. Paglioli

Explanation: The Virgo Cluster of Galaxies is the closest cluster of galaxies to our Milky Way Galaxy. The Virgo Cluster is so close that it spans more than 5 degrees on the sky - about 10 times the angle made by a full Moon. With its heart lying about 70 million light years distant, the Virgo Cluster is the nearest cluster of galaxies, contains over 2,000 galaxies, and has a noticeable gravitational pull on the galaxies of the Local Group of Galaxies surrounding our Milky Way Galaxy. The cluster contains not only galaxies filled with stars but also gas so hot it glows in X-rays. Motions of galaxies in and around clusters indicate that they contain more dark matter than any visible matter we can see. Pictured above, the heart of the Virgo Cluster includes bright Messier galaxies such as Markarian's Eyes on the upper left, M86 just to the upper right of center, M84 on the far right, as well as spiral galaxy NGC 4388 at the bottom right.

Source: APOD

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