'The Year of the Solar System' to begin

October 8 2010, Dr. Tony Phillips

To mark an unprecedented flurry of exploration which is about to begin, NASA announced yesterday that the coming year will be "The Year of the Solar System" (YSS).

"During YSS, we'll see triple the [usual] number of launches, flybys and orbital insertions," says Jim Green, Director of Planetary Science at NASA headquarters. "There hasn't been anything quite like it in the history of the Space Age.

Naturally, it's a Martian year.

"These events will unfold over the next 23 months, the length of a year on the Red Planet" explains Green. "History will remember the period Oct. 2010 through Aug. 2012 as a golden age of planetary exploration."

The action begins near the end of October 2010 with a visit to Comet Hartley 2. On Oct. 20th, Hartley 2 will have a close encounter with Earth; only 11 million miles away, it will be faintly visible to the naked eye and become a splendid target for backyard telescopes. Amateur astronomers can watch the comet as NASA's Deep Impact/EPOXI spacecraft dives into its vast green atmosphere and plunges toward the icy core. On Nov. 4th EPOXI will fly a mere 435 miles from Hartley's nucleus, mapping the surface and studying outbursts of gas at close-range.

Later in November, NASA astrobiologists will launch O/OREOS, a shoebox-sized satellite designed to test the durability of life in space.

Short for "Organism/ORganic Exposure to Orbital Stresses," O/OREOS will expose a collection of organic molecules and microbes to solar and cosmic radiation. Could space be a natural habitat for these "micronauts?" O/OREOS may provide some answers. Bonus: The same rocket that delivers O/OREOS to space will carry an experimental solar sail. NanoSail-D will unfurl in Earth orbit and circle our planet for months. Occasionally, the sail will catch a sunbeam and redirect it harmlessly to the ground below where sky watchers can witness history's first "solar sail flares."

On December 7, 2010, Japan's Akatsuki (Venus Climate Orbiter) spacecraft grabs the spotlight when it enters orbit around Venus. The mission aims to understand how a planet so similar to Earth in size and orbit went so terribly wrong. Venus is bone-dry, shrouded by acid clouds, and beset by a case of global warming hot enough to melt lead. Instruments on Akatsuki will probe Venus from the top of its super-cloudy atmosphere all the way to the volcano-pocked surface below, providing the kind of detailed information researchers need for comparative planetary.

"Take a deep breath," says Green, "because that was just the first three months of YSS!"

The action continues in 2011 as Stardust NExT encounters comet Tempel 1 (February 14), MESSENGER enters orbit around Mercury (March 18), and Dawn begins its approach to asteroid Vesta (May).

"For a full month Dawn will be able to see Vesta even more clearly than Hubble can," marvels Green. "The only way to top that would be to go into orbit."

And that is exactly what Dawn will do in July 2011: insert itself into orbit for a full-year study of the second-most massive body in the

asteroid belt. Although Vesta is not classified as a planet, it is a full-fledged alien world that is expected to mesmerize researchers as it reveals itself to Dawn's cameras.

Next comes the launch of the Juno spacecraft to Jupiter (August), the launch of GRAIL to map the gravitational field of the Moon (September), and the launch of a roving science lab named "Curiosity" to Mars (November).

"The second half of 2011 will be as busy as some entire decades of the Space Age," says Green.

Even then, YSS has months to go.

2012 opens with Mars rover Opportunity running the first-ever Martian marathon. The dogged rover is trundling toward the heart of Endeavour Crater, a city-sized impact basin almost two dozen miles from Opportunity's original landing site.

"Opportunity is already under the influence of the crater," says Green. "The ground beneath the rover's wheels is sloping gently down toward its destination—a welcome feeling for any marathoner."

Sometime in mid-2012, Opportunity will reach Endeavour's lip and look over the edge deeper into the heart of Mars than any previous robotic explorer. The only thing more marvelous than the view will be the rover itself. Originally designed to travel no more than 0.6 miles, Opportunity's rest stop at Endeavour will put it just miles away from finishing the kind of epic Greek run that athletes on Earth can only dream about.

Meanwhile, halfway across the solar system, Dawn will fire up its ion engines and prepare to leave Vesta. For the first time in space history, a

spacecraft orbiting one alien world will break orbit and take off for another. Dawn's next target is dwarf planet Ceres, nearly spherical, rich in water ice, and totally unexplored.

The Year of the Solar System concludes in August 2012 when Curiosity lands on Mars. The roving nuclear-powered science lab will take off across the red sands sniffing the air for methane (a possible sign of life) and sampling rocks and soil for organic molecules. Curiosity's advanced sensors and unprecedented mobility are expected to open a new chapter in exploration of the Red Planet.

"So the end," says Green, "is just the beginning. These missions will keep us busy long after YSS is history."

Provided by Science@NASA