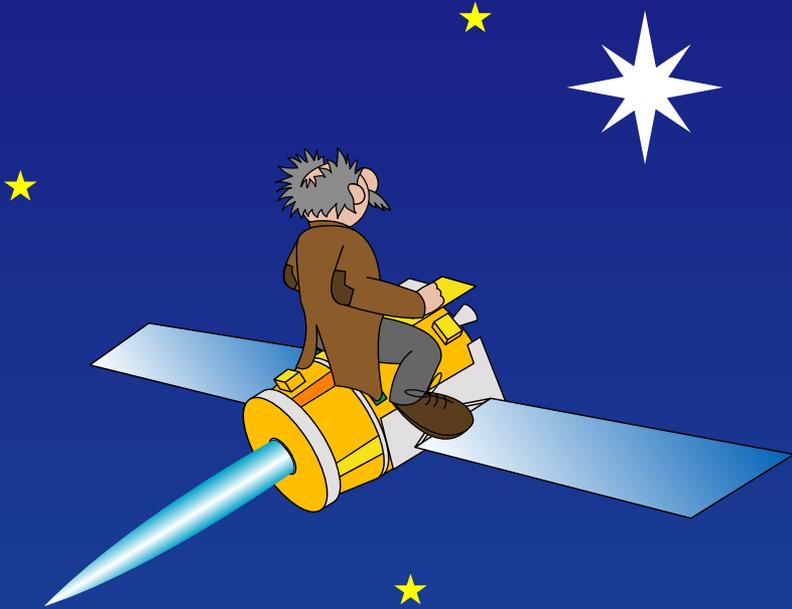




# Professor Starr's Dream Trip:

or, how a little technology goes a long way  
Unabridged version



**The story of NASA's New Millennium Program  
and how it makes scientists' dreams come true**

**Story by Diane K. Fisher  
Illustrations by Alexander Novati**





Professor Starr and all his grads  
are working on a scheme  
To learn about a universe  
that none of us has seen.  
They know that light is all around  
that's largely undetected.  
And strange, yet true, are waves of  
gravitation, long neglected.

They long to see and hear and feel  
beyond their feeble senses,  
To break through complex mysteries  
of how and where and when-ces.  
"Technology!" they cry "is what we need  
to find more answers.  
We've gone as far as we can go  
without more sense enhancers!



"We also need more ways to go  
to places not yet seen.  
So many planets, moons, and stars,  
and all the rocks between  
Have yet to be explored by us,  
or any of our probes!  
We'd like to see what life is like  
on many other globes!

"Just what the sort of spectro-gravo-  
fluxo-speedo-meter,  
What sort of thruster, power maker,  
communicator, heater,  
What sort of attitude control,  
what sort of navigator,  
And just how good and fast and tough  
must be the computator?"



This science team of dauntless searchers  
    need more fancy widgets  
And far more clever ways to get them  
    launched on just a midget  
Budget! For they've but meager fortunes,  
    not much cash for spending,  
But gobs of visions, wishes, plans  
    for missions never-ending.

"What to do? Where to look?  
    How to get attention?  
We need some clever innovation  
    and techno-intervention!"  
One grad jumps up and shouts out loud  
    "I've had a blinding flash!  
Let's call NASA! They've no doubt got  
    a technologic stash



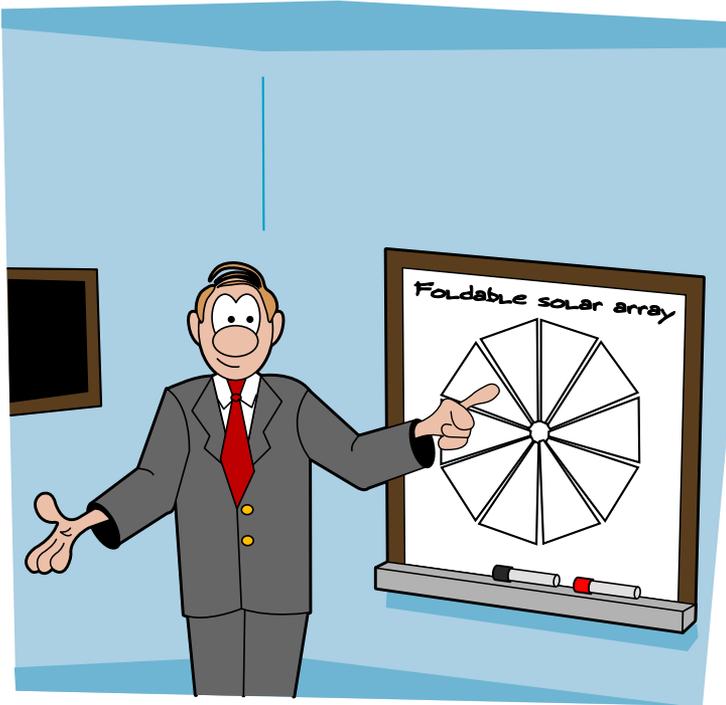
Of all the latest, hi-tech gizmos,  
tried and true and tested,  
Ready for the likes of us,  
stuff others have requested.  
Super-sensing image makers.  
Multi-micro-sats.  
Fast, efficient, tiny engines.  
Martian habitats?"

"Well, seems I've heard of some of those,"  
The Prof says, looking brighter.  
"THEY must have a way to make  
our techno-burden lighter!"  
And so he phones up NASA Central  
in Washington, D.C.,  
Finds "New Millennium Program,"  
for short, just "NMP."



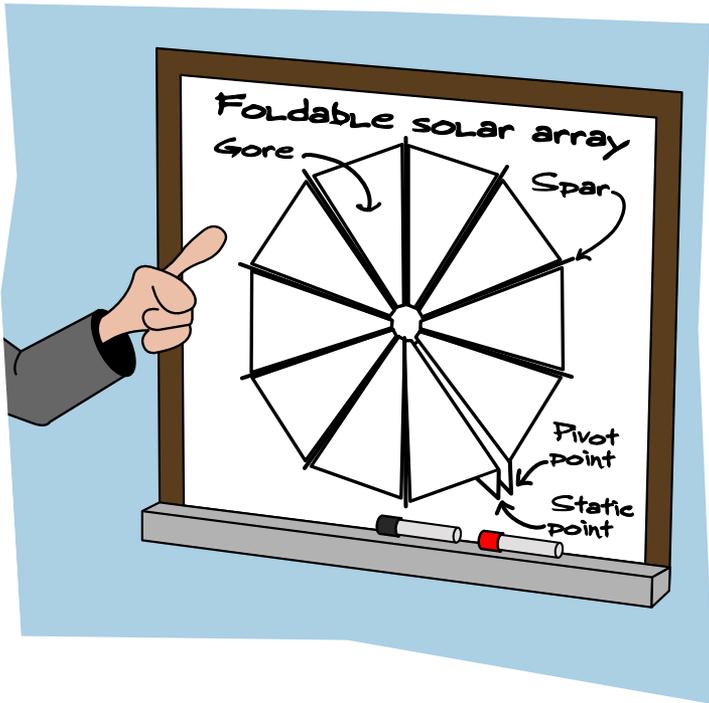
"We're heading for a meeting.  
You'd better come along,"  
The boss of NMP invites,  
"A scientist? You belong!"  
Professor Starr writes down his list  
and hops aboard a plane  
To join the other scientists  
and all their hopes explain

To clever NASA engineers  
and managers, who then  
Have the very tricky job  
to pick the ones who'll win  
Their wish, and get some special help  
with spacey applications,  
Like lightweight masts for solar sails  
and ion-proof creations.



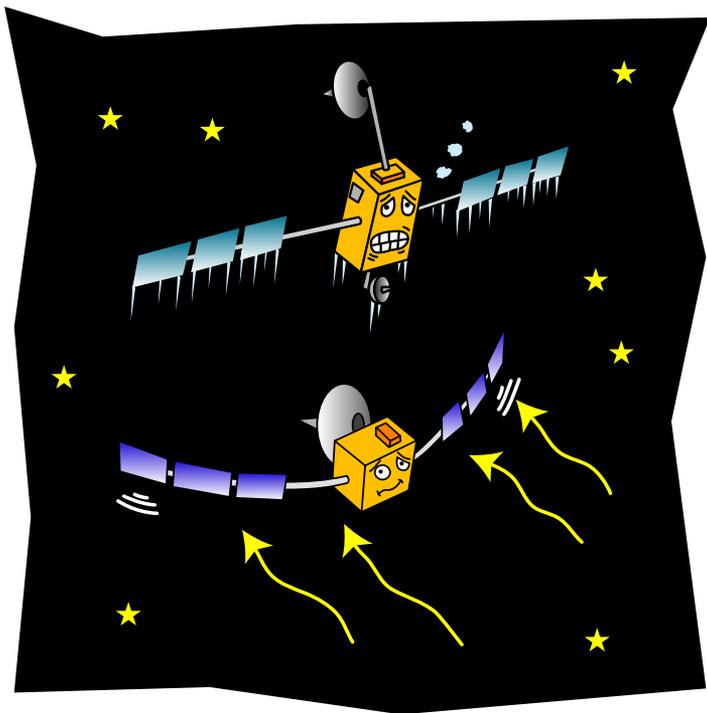
Soon the profs have gone away.  
And now these NASA's whizzes  
Must figure what to test in space.  
So many worthy wishes!  
Which wish will bring the greatest prize,  
will benefit the most—  
Technologies that really help  
to bring more answers close.

"Hmmm. Build some tiny satellites  
that launch and fly en masse?  
Or make and test a novel engine  
that runs on xenon gas?  
Perhaps computer software  
that decides all by itself  
What data's worth collecting?  
Or a computer off-the-shelf



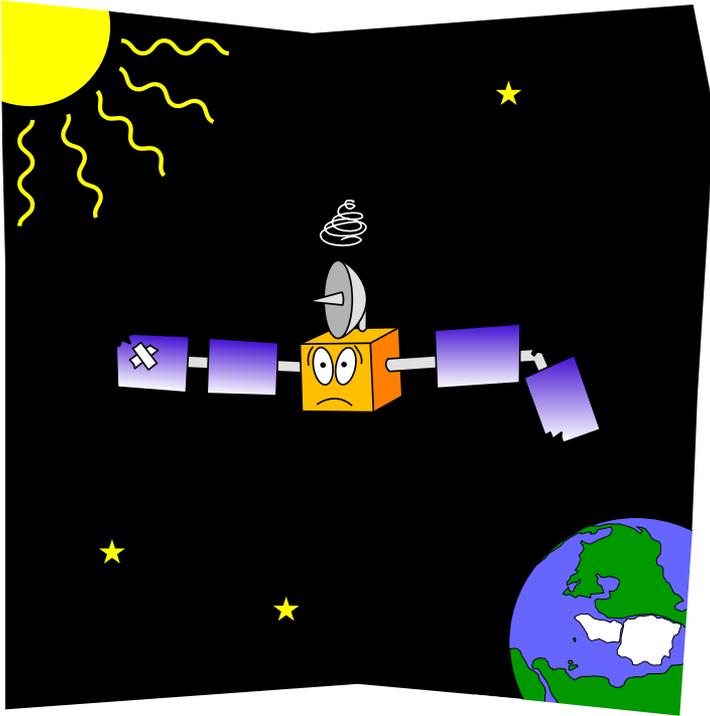
"That, with a little fixing up,  
can handle all the stresses  
Of being out in outer space  
with all its harsh excesses?  
Or how about a solar sail?  
Or a solar power array?  
It barely weighs a birdly ounce  
and neatly folds away!

"Perhaps a new star compass  
with a gyro in its guts  
To keep the spacecraft pointed right  
and know its whereabouts?"  
They struggle to make up their minds,  
to pick the next big task.  
To take some innovations,  
help perfect them, and then ask,



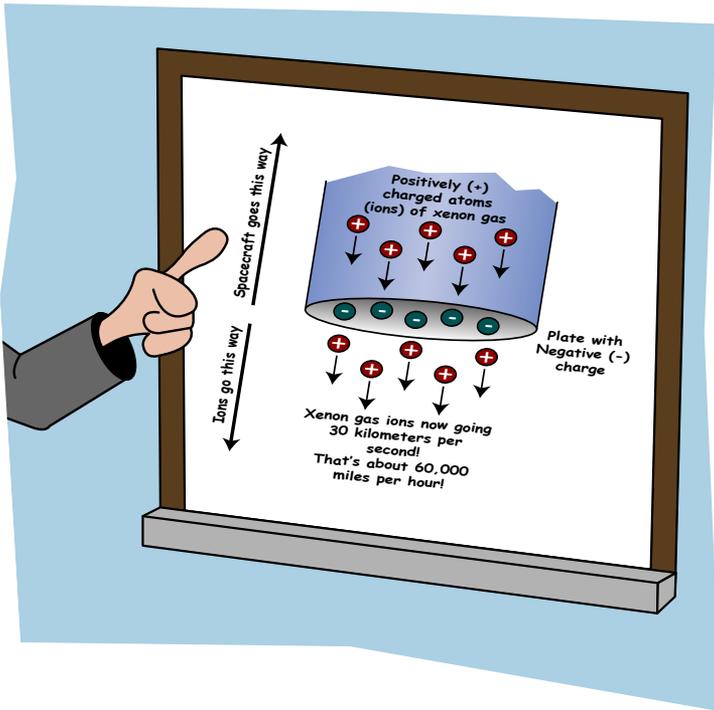
"Now can this new invention,  
this solution and design,  
Stand up to all the hot and cold,  
the solar winds malign  
That blast and cook and penetrate  
all objects in their way,  
The zero-g, no gravity!  
Galactic Cosmic Rays!

"And what about the vacuum?  
To say nothing of the shocks  
Of blasting off from terra firm,  
the rattles, and the knocks  
Of ripping through the atmosphere  
at double-digit g's!  
The shaking, baking punishment  
that's just before the freeze!



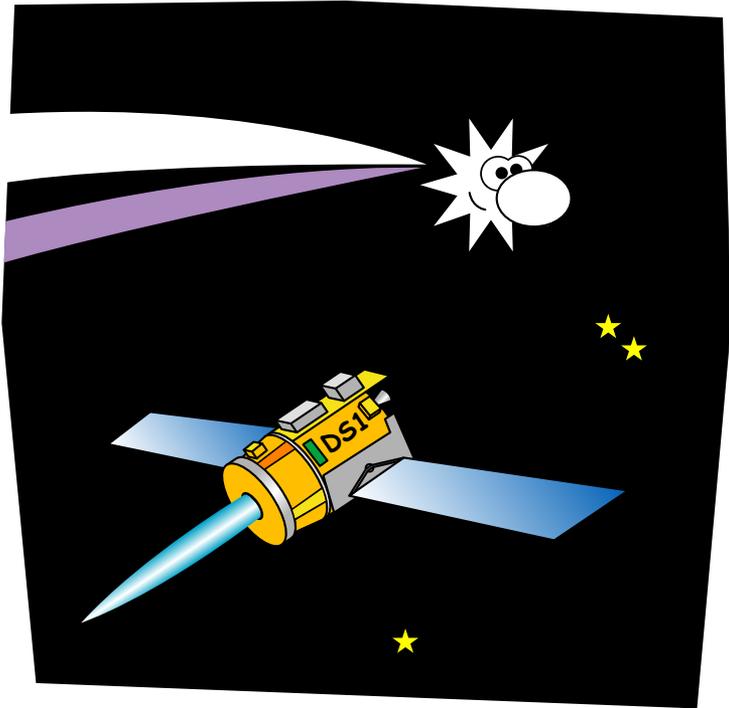
"The scientists don't want to risk  
their research—just in case  
The gadgets that do fine on Earth  
Don't work too well in space.  
They want their spacecraft rides well tried,  
No doubts about their mettle."  
So they count the costs, the pros and cons,  
the benefits, then settle . . .

"An ion engine! That's the thing  
that'll benefit the mostest,  
It will keep on pushing, poking, nudging,  
getting them the closest  
To their destination.  
To going on the cheap!  
No matter what the spacecraft,  
a technologic leap!



"Instead of blasting pounds of fuel  
each time it needs to thrust,  
And coasting all the other times,  
the ion engine just  
Never stops its gentle push, keeps on,  
just like the tortoise,  
But slowly, slowly going faster,  
no atmosphere to thwart its

"Steady progress, steady climb  
to speeds beyond the cruisers.  
So little fuel, so little mass,  
so many spacecraft users  
Will want this drive!" So off they run  
to test this innovation,  
To find a spacecraft, plan the trip,  
and pick some destinations.



To give the ion engine time and  
space to show its stuff,  
They have to send it far away,  
and make its journey tough.  
They name the mission Deep Space One,  
because it must go far.  
"We'll have it browse some asteroids,  
a comet, then a star!"

(Well, maybe not a star.)

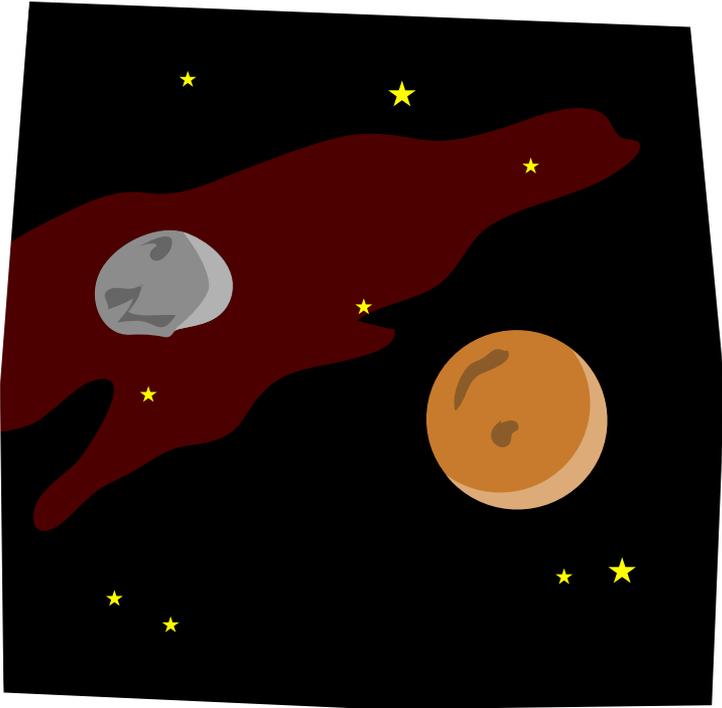
So off it goes, a perfect launch.  
It's ready for the test  
They put the little spacecraft through.  
They never would have guessed  
It would do so well! The engine shines.  
The engine gets an A!  
And now the engine's ready.  
It is proven. It's OK!



"The scientists and engineers  
now have a way to make  
Those really long trips to the moons  
And comets overtake!  
Or who knows *what* the sort of oddball  
mission they can try?  
With their thorough, careful plans,  
convention they'll defy!"

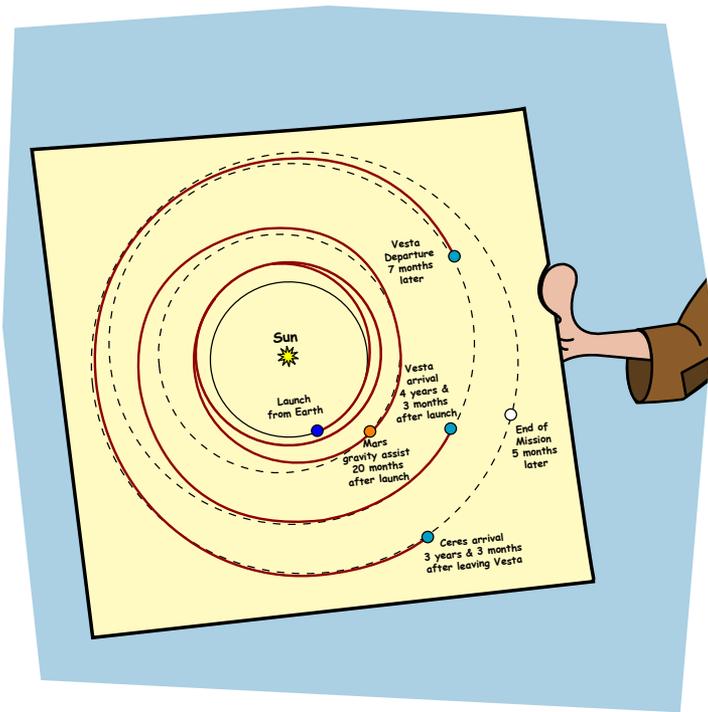
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Professor Starr jumps right to work.  
He knows just what to do!  
The mission to some asteroids  
before now he'd pooh-poohed  
Could now be done! They had a way!  
With xenon ion thrust  
This tiny engine, little gas,  
could manage with a gust



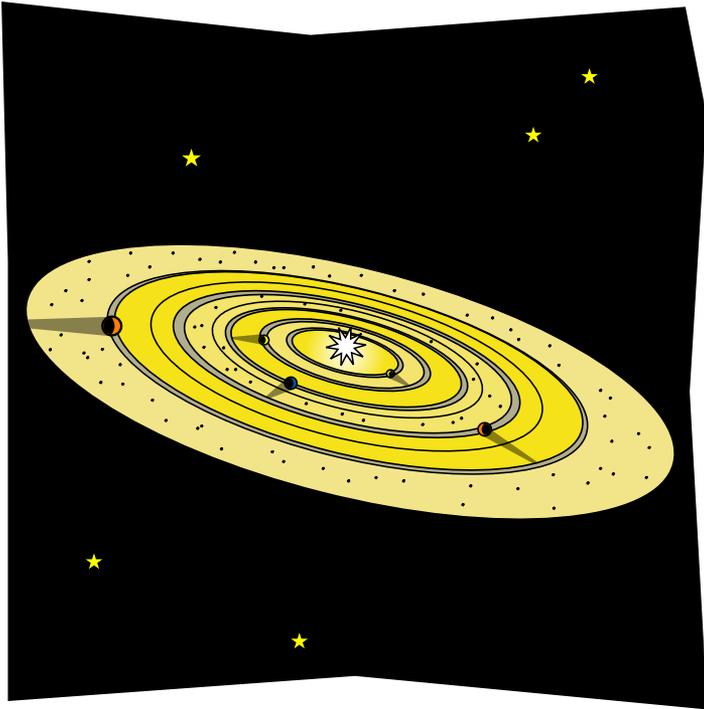
No bigger than a whisper,  
what used to take a blast  
With pounds and pounds of rocket fuel  
combusting really fast.  
"I've got a brilliant inspiration!"  
he cries out to his grads.  
"Now let's get down and work it out.  
Go get your yellow pads!"

Two asteroids he has in mind are large,  
yet not quite planets.  
Their planet-building put on hold  
when Jupiter began its  
Weighty swings around the Sun.  
No more accumulation  
Of rocks and dust within the belt  
of asteroids' location.



Vesta, Ceres are their names,  
 two most intriguing places.  
 One wet, one dry, both stuck in time,  
 both holding clues and traces  
 Of solar system's dawning moments,  
 planet evolution.  
 "We'll visit both! We'll stay awhile.  
 We'll get some resolution!

"With just a tiny spacecraft,  
 with just a splash of gas,  
 A double spiral 'round the Sun  
 will get us there at last!  
 We'll sneak up slowly, matching speeds.  
 We must do careful math!  
 Then gently tap our ion brakes,  
 let Vesta bend our path



"Til into orbit round we go.  
We'll stay awhile and glean  
Whate'er we can on lava flows,  
basalt, and olivine.  
We'll map the surface, light and dark,  
and track the gravity field,  
And no doubt find surprises,  
as all our space trips yield!

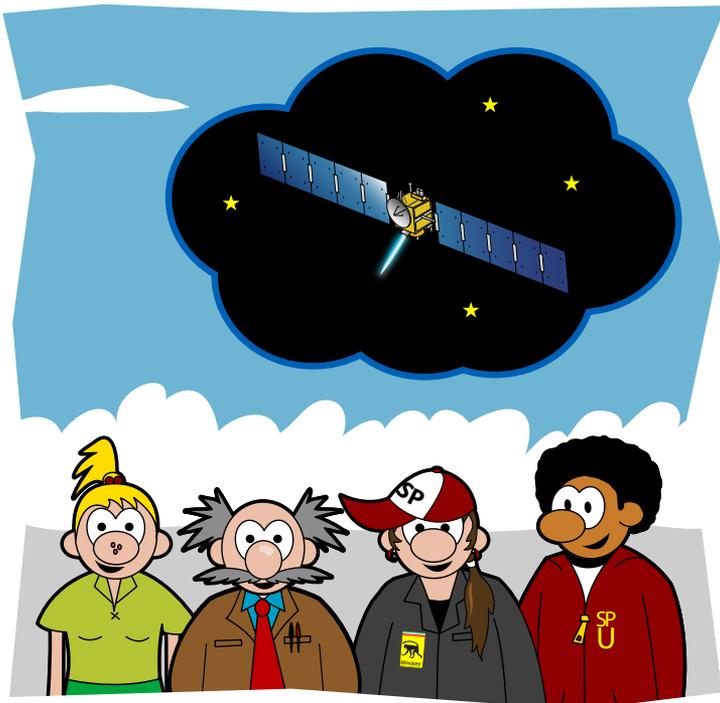
"Then, after months of Vesta fun,  
we'll still have oomph to spare.  
We'll fire up our ion drive  
and spiral out of there.  
One (or nearly one) more swing  
around the Sun will see  
Us sneaking up on Ceres  
for another science spree.



"Once again we'll plan our speed  
so not to zip right past,  
But just to be so gently caught  
by gravity and cast  
Into a gentle orbit 'round Ceres.  
Then we'll map  
This asteroid, the largest,  
and its frosty polar caps.

"What a mission! What a trip!  
Never done before!  
We'll call it Dawn to signify  
its journey to explore  
The dawning steps to planethood,  
our solar system's start.  
These mysteries, these mighty quests,  
are closest to our heart."

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And so it comes to pass that Dawn  
is judged a worthy plan.  
Technology has made it so,  
has soundly bridged the span  
From dreamy wish to solid fact,  
to visions turned to gold.  
New students of the stars now have  
a way to plan more bold

Adventures using useful stuff,  
devices guaranteed  
Thanks to NASA's careful planning,  
much by NMP,  
Listening, weighing, choosing,  
growing, testing, proving true.  
"Just one last thing," says Starr, aglow,  
"To NMP, thank you!"

THE END!





**For more information, visit:**

**[nmp.nasa.gov](http://nmp.nasa.gov)**

**[spaceplace.nasa.gov](http://spaceplace.nasa.gov)**

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