NARRATOR: Almost 10 years before the space shuttle first launched and 25 years before the first pieces of the International Space Station were connected, NASA launched Skylab, a home above our home planet.

JON COWART: Hello and welcome. I'm Jon Cowart. NASA has long focused on finding out how astronauts can live and work in space. Finding the answer to that was one of the many reasons behind building the International Space Station.

But it was also the driving question meant to be solved by America's first space station, an orbital workshop called Skylab.

By the time the last crew left in February 1974, astronauts spent more time in space than all of NASA's previous missions combined.

Their research would set the stage for today's successes onboard the International Space Station.
NASA and the United States had not yet landed on the moon when the idea of a space station started taking shape.

BILL SCHNEIDER, SKYLAB PROGRAM MANAGER: "Our objective was in the first place to get a lot of medical information so that we could have enough data to allow the space station to have crews that could stay up there for six months."

JON COWART: The result was Skylab, a workplace in space designed to host scientific discovery without forgetting the comforts of life on Earth.

The workshop was built into an empty third stage from a Saturn V moon rocket. A pair of solar wings would fold out to provide electricity for the life support and research equipment inside.

The three-man crew would arrive in an Apollo capsule launched aboard another rocket. A telescope to study the sun and other instruments were mounted atop the workshop, and they were powered by four separate solar arrays that gave the Skylab a windmill appearance.
The finished complex was folded up, fit into a nosecone on top of a Saturn V rocket and launched into orbit from Kennedy Space Center in Florida on May 14, 1973.

But the ascent soon grew too rough for the space station, and the air rushing over the outside of the Saturn V tore off one of the large solar panels and a crucial heat shield meant to protect the workshop.

JON COWART: The second large solar panel was stuck in place, and Skylab reached orbit critically low on electricity.

Engineers struggled to find a fix for the outpost, and it fell to the first Skylab crew to make it work.

JOE KERWIN: The situation that faced our crew as we launched, of course, was the broke Skylab. It was hot, it lacked electrical power.

The whole program might be lost and we launched with a command module full of instruments many of which we had never seen before.

They handed us the checklist kind of on the way in and said, "Good luck, guys."
JON COWART: Moonwalker Pete Conrad and astronauts Joe Kerwin and Paul Weitz

00:02:57,629 --> 00:03:01,159
lifted off May 25 with a kit to save the mission.

00:03:01,159 --> 00:03:07,949
LAUNCH COMMENTATOR: The clock is running and Skylab has cleared the tower.

00:03:07,949 --> 00:03:12,369
JON COWART: The astronauts found the crippled Skylab as they expected and quickly

00:03:12,370 --> 00:03:16,170
deployed a sunshield over the exposed section of the laboratory.

00:03:16,169 --> 00:03:21,839
BILL SCHNEIDER: When we lost that heat shield, we proved that man was a very, very

00:03:21,840 --> 00:03:29,439
vital part of space exploration and that he could do a lot of repairs and fixes.

00:03:29,439 --> 00:03:33,599
NARRATOR: Repairs and improvements would follow throughout the Skylab program,

00:03:33,599 --> 00:03:37,739
including spacewalks that ultimately freed that stuck solar panel.

00:03:37,740 --> 00:03:43,020
With Skylab back in shape, three crews of astronauts would go on to prove they could

00:03:43,020 --> 00:03:47,219
handle weeks at a time in microgravity with few ill effects.

00:03:47,219 --> 00:03:53,189
They recorded brilliant images of the sun and took the first pictures of solar flares.

00:03:53,189 --> 00:03:57,919
And they turned sensitive instruments toward Earth, offering the first comprehensive

00:03:57,919 --> 00:04:00,839
studies of our home planet.

00:04:00,840 --> 00:04:04,550
Skylab was a pioneering home for astronauts in several ways.
Astronauts set a record for spacewalks as they repaired the space station on the first flight, and then serviced Skylab's instruments throughout the missions. They also spent many hours simply learning how to live comfortably in space.

So, NASA designed Skylab to include many of the features of home. Take a look . . .

For the first time, astronauts were in orbit long enough to see their hair grow appreciably during a mission. So they learned barber skills that worked in space, notably using a vacuum to get the loose hairs.

A vacuum came in handy again as the crews used one to pull water away in the shower designed to work in weightlessness.

They adjusted to sleeping in an open space while floating. And they learned the value of exercise, an important lesson that is applied vigorously to the International Space Station crews.

Of course, there were plenty of experiments, too.

The Skylab medical experiments were perhaps one of the most important things NASA accomplished during Skylab missions. One of Kerwin's jobs was drawing blood from his
Skylab 2 commander Pete Conrad and crewmate Paul Weitz . . .

JOE KERWIN: His area of weakness that I already detected on the ground was that he
does not like needles and he has a tendency to pass out

when you stick him with a needle.

You can't pass out in zero-g, you just can't, the blood doesn't rush to the feet, you know.

The crews learned it took the body about 16 days to completely
adapt to weightlessness.

JOE KERWIN: It was a beautiful machine. It was clean, it was quiet, we had plenty of
volume to do our thing.

We'd go off after breakfast in the morning, somebody would go to do Earth resources,
somebody would go do solar physics, somebody would be downstairs doing
housekeeping and you couldn't even hear or see each other,
you'd have to talk on the intercom.

Skylab, later on in the mission, although I loved the mission, a lot of the days
were repetitive and you had to have good self-discipline to really do well. I felt it took a
lot more self-discipline to fly a good Skylab mission than it did to fly a good lunar
mission because of this one psychological thing.

JON COWART: The work on Skylab gave NASA fundamental information that would
later be used to design and build the International Space Station.

Living and working in space brought about completely unexpected
challenges and solutions.

Even something as simple as moving around inside the large orbiting workshop
was not done the way astronauts expected.

PETE CONRAD: Tell you one thing, the four Conrad boys would sure have a blast up
here, along with every other kid in the United States if they could ever get inside.

It'd be Disneyland and everything else.

AL BEAN: But mostly we said you'd just crawl along or move along and after the very first
day of watching you, nobody crawled anywhere, everybody flew everywhere.
JON COWART: There were other, more complex problems to solve, too, and the solutions would become an encyclopedia for the International Space Station.

AL BEAN: So many things were learned on Skylab are going to be needed in space station and there's no way to figure them out on the ground.

JON COWART: Before astronauts learned how to live and work inside the International Space Station, designers pored over the lessons of Skylab.

They considered the kind of accommodations astronauts would want, judging them against what worked 35 years earlier.

Skylab also contributed to parts of the space shuttle program, notably the jetpack called the Manned Maneuvering Unit used by spacewalkers to float free of the shuttle to retrieve satellites.

Skylab astronauts flew the prototype jet pack in the expansive workshop area. They proved they could keep control in weightlessness and refined what kind of control system would be used.

About 10 years after the last Skylab crew left space, Bruce McCandless used the Manned
Maneuvering Unit to fly far from the space shuttle Challenger and back safely.

The jet packs would be used again on later flights to catch satellites and bring them back to the shuttle so they could be repaired and returned to service.

JON COWART: From what it set out to do to what it ultimately accomplished, Skylab has remained a fascinating element of NASA's history, and an important map for its future.

One day astronauts may fly inside vehicles inspired by Skylab and its crews for months on end as they traverse the millions of miles on the way to Mars.

On future missions, astronauts will likely be called on to improvise repairs and make other changes to their spacecraft by conducting unplanned spacewalks. Just as Skylab's crews proved could be done.

For NASA, I am Jon Cowart. Thank you for joining us.