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Pioneer 10 shows

Sun's far-reaching
influence

NASA'S Pioneer 10 is now just over
halfway between the orbits of Uranus
and Neptune, and continues to record the effects of the Sun's atmosphere and magnetic envelope. These effects include a constant solar wind, buffet-ing by solar magnetic storms, and often radiation belts.

Some scientists had predicted that the border between the Sun's atmos-phere and interstellar space would be about five times the distance between the Earth and the Sun. Pioneer 10 will reach 25 times the distance between the Earth and the Sun on July 26 (almost 3,740 million km).
The Pioneer 10 results have been used to forecast the solar conditions that Voyager 2 will experience when it flies past Uranus in 1986. Similar conditions are anticipated for Nep-tune and Pluto.

Space Shuttle's second stepping stone into space

Nasa has designed this crew insignia for the second Space Shuttle flight, which will be piloted by Joe Engle and Richard Truly

Spaceshots...
India's Apple communications test satellite has apparently lost part of the electrical power from its solar array. Apple was launched aboard the third Ariane test flight on June 19. It is not clear how the loss of power will affect Apple's mission.

IBM and British Aerospace are planning to start a service for business communications via satel-lite in Europe. The two companies have asked British Telecom to participate.

Launch pad 39A at the Kennedy Space Centre, Florida, is apparently not yet ready to load payloads into the Shuttle while it is on the pad. Large payloads can be placed in-side the clean room's rotating ser-vice structure, but cannot be re-moved later if the launch does not go-ahead. Nasa is now working on modifications to cure the problem.

WORK on the second Space Shuttle launch pad at the Kennedy Space Centre (KSC), Florida, still has some way to go, but the complex is now beginning to take shape. The second launch site, pad 39B, is already simi-lar in appearance to pad 39A—from which the first Shuttle flight was launched in April. Current plans call for pad 39B to be completed by July 1985, with a launch later that year. Pads 39A and B were built for the Apollo programme but also launched Nasa's Skylab orbiting laboratory and the Apollo-Soyuz test project. Since the last Saturn launch both pads have been in standdown maintenance—a state in which water, electricity and other services were still workable. Nasa began conversion of pad 39A for the Shuttle in 1975-76, but work on pad 39B did not begin until 1979.

There are several major differences between the Shuttle pads and the original Apollo design. But Nasa has been careful to re-use the Apollo parts wherever possible—the fixed Shuttle structure uses sections of the Apollo service tower. There were plans to alter the pipes and tanks for loading liquid hydrogen and oxygen, but in the end Nasa decided to save money by accepting an extra two hours on the time needed to fill the External Tanks.

The Shuttle pads differ from those for Apollo mainly by having a rotat-ing service structure, an altered launch platform and water-based sound-suppression. Inside the rotating service structure there is a large clean room, which allows satellites to be loaded into the Shuttle's payload bay on the pad. The structure also has plumbing that allows the Shuttle to be fuelled with hydrazine on the pad. An altered launch platform is neces-

sary because of the Shuttle's power-plant arrangement—three engines clustered together at the back of the Orbiter, plus two Solid Rocket Boosters at the side (Apollo Saturn V had five engines clustered together). New holes have been made in the launch platform for the Shuttle ex-haust pattern. Nasa has three launch platforms. One was used for the first Shuttle flight, another is being modi-fied for pad 39B, and the third is un-altered. If Nasa does get a fifth Orbiter, the remaining platform would also be converted.

Shuttle launches call for sound-suppression to protect the craft and its payload from noise reflected from the launch pad. The protection com-prises a horizontal curtain of water several metres above the launch plat-form, produced by six large nozzles called rainbirds. The water supply needed for the rainbirds meant that Nasa had to lay more pipes to the pads.
Nasa estimates that it costs roughly $55 million at 1980 prices to convert an Apollo launch pad for Shuttle use. The conversions are KSC's responsi-bility, but use outside contractors. A third Shuttle launch pad is being built—that which the USAF is fund-ing at Vandenberg AFB, California. In this instance there is no Apollo pad to modify, and the USAF has opted to erect the Shuttle elements on the pad. There will be a payload preparation room beneath the pad, allowing a fast transfer to service tower and Orbiter. Vandenberg is used to launch satellites into polar
orbits—its situation allows spacecraft
to fly over the sea to the south of
California. Military payloads for
equatorial orbits will still be launched
from KSC.

Naso has begun to prepare pad 39B at the Kennedy Space Centre, Florida, for its first Space Shuttle launch, currently set for 1985. Pad 39B is already similar in appearance to pad 39A, from which the first Shuttle flight was launched. The rotating service structure is on the left, while part of the flame trench is visible just left of centre

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