

## USA – from the study of a spaceplane to the Shuttle

The aim of the exhibit is to document, through astrophilately, the enormous effort to study and research a new way of going into space.

The Spaceplane is an aircraft designed to fly beyond the Kármán line that, conventionally, identifies the boundary between the Earth's atmosphere and space, at an altitude of around 100 km above sea level. It incorporates some of the characteristics of the airplanes, whose wings are used only when crossing the atmosphere during the reentry phase.

These traditional vehicles are designed to take off vertically, carried by non-reusable rockets.

Proposals, ideas, projects and prototypes of spaceplanes flourished since the beginning of the twentieth century, and were especially implemented in the USA in the Sixties at the beginning of the Space Era.

Through philatelic items, cancelled in civil and military bases' post offices, the exhibit shows studies of projects and prototypes of spaceplanes performed from the early sixties to the first flights of the Space Shuttle, including:

1. Precursors
2. ASSET (Aerothermodynamic Elastic Structural Systems Environmental Tests), experimental vehicle for the study of aerodynamic heating during the re-entry phase, launched by the Thor-DSV2F missile.
3. X-20 Dyna-Soar, designed to glide over Earth like a normal airplane under the control of the pilot, landing at an airport runway, instead of simply splashing down, supported by parachutes (very similar to the future Space Shuttle).
4. Martin Marietta X-24 (also known as SV-5P): experimental airplane jointly developed by the USAF and NASA between the 1960s and 1970s as part of the PILOT research program for a carrier body intended for atmospheric re-entry.
5. NASA/USAF lifting body capable of maneuvering during the atmospheric reentry phase: NASA M2-F1, the Northrop's HL-10, M2-F2 and M2-F3.
6. SV-5D Martin Marietta models (scaled-down model of the future X-24)
7. X-24A, experimenting with the concept of unpowered reentry and landing. X-24A reached maximum altitudes of 21.8 km (71,400 ft) and speeds of 1,667 km / h (1,036 mph). The last flight of the X-24A version (the 28th) was conducted on the 4<sup>th</sup> June 1971.
8. Space Shuttle: based on these concepts, the Space Transportation System (STS) – the NASA reusable space launch system used for space missions in Earth orbit – launched into orbit for the first time on 12 April 1981.



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