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OCTOBER 2024

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Galactic 01

POSTED STAMP COVER OF THE FIRST ITALIAN SUBORBITAL FLIGHT

Called *Galactic 01*, this flight departed on 29 June 2023 from Spaceport America in the New Mexico desert, thereby ushering in the Virgin Galactic commercial travel era. It has already broken several records, as the first Italian suborbital flight in history and the world's first suborbital mission for scientific research purposes only. The mission was named *Virtute 1* (Italian Flight for sUborbiTal Research and Technology) echoing the motto of the Italian Air Force *Virtute Siderum Tenus* (with valour towards the stars). Funded by the Italian Air Force in conjunction with Centro Nazionale delle Ricerche (CNR), it marked an important milestone on the centenary year for both these prestigious institutions.

AN ITALIAN CREW

Its crew members were two Italian Air Force officers and a CNR engineer: Colonel **Walter Villadei** (mission commander), Lt. Col. **Angelo Landolfi** (responsible for the Italian crew's medical issues) and researcher **Pantaleone Carlucci** (responsible for the on-board experiments coordinated by the CNR). After the mission these were referred to as *astronauts 008*,

009 and *010* respectively.

Unity was piloted by commander **Mike Masucci**, of clear Italian descent, and Italian **Nicola Pecile**.

Suborbital shuttle Ss2 was brought to altitude by 'carrier' aircraft *WhiteKnightTwo* Vms 'Eve' and released at an altitude of approximately 15 km.

Then the shuttle fired up its thruster and pointed upwards, passing Mach 3 and reaching a height of about 85.3 km, enough to see the curvature of the Earth and the contrast between the light of the Earth and the blackness of the sky.

Taking advantage of its approximately three minutes of microgravity, the three new 'astronauts' conducted their 13 planned experiments in biomedicine, fluid physics, and the development of innovative materials under microgravity conditions. At the end of the mission, they saluted the Italian flag.

Walter Villadei wore the **new Smart Flight Suit 1 (SFS1)** prototype designed to ergonomic criteria by Marche-based start-up Spacewear to provide comfort with breathable, flame-retardant fabrics capable of withstanding more than 6 Gs of acceleration. The technological fabric from which it is made incorporates integrated sensors to collect real-time biometric data and

the astronaut's physiological responses during each phase of space flight, without cables or electrodes.

SCIENTIFIC MICROGRAVITY TESTS

Angelo Landolfi had three available devices with which to perform memory exercises to assess cognitive performance in microgravity: a tablet strapped to his leg to perform mental workload and attention tests, an electroencephalogram headset worn on his head to measure brain activity, and a sensor on his hand to measure the skin's galvanic response.

Pantaleone Carlucci, a CNR energy engineer in charge of the five on-board experiments, activated the **TESIS** material mixing experiment at the University of Tor Vergata and the **Doosy-CNR-VG** and Liulin-CNR-VG experiments, of which he was co-principal investigator: the dosimeters that made measuring cosmic radiation in the mesosphere possible (50 to 100 km), collecting data along the vertical profile in a layer of the atmosphere that was virtually unexplored to date as astronauts normally pass through it very quickly. He also wore a series of sensors to measure heart rate, brain function and other vital parameters.



» The end of the *Virtute 1* mission on the Mojave Desert runway.



» The *Spaceship* ready for take-off embraced by the large mothership taking it to atmospheric altitude.

Almost all of the three minutes spent in microgravity were taken up by astronauts' experiment-related activities, which had been planned with great precision. This did not prevent them from experiencing first-hand the effects of microgravity and seeing our planet silhouetted against the darkness of space, if only for a few seconds before the re-entry phase.

CELEBRATED WITH POSTAGE STAMP COVERS

The Virgin Galactic *Ss2 Unity* spacecraft is a condensation of aerospace technology that recalls the tests carried out in the 1950s and 1960s by the USAF and NASA with the **X-15 rocket planes**.



» TV link from space with the Italian crew and the tricolour flag.

From a technological point of view, these flights represent a breakthrough which opens up a new era of suborbital point-to-point transport challenges: in the not too distant future, large private-sector space companies will revolutionise our idea of mobility by switching from air to space flights. In fact, leaving the atmosphere is seen as the perfect intercontinental travel shortcut, minimising travel time between one part of the planet and another. The historic mission was celebrated, especially by US collectors, with numerous commemorative covers.

To celebrate the Virtute-1 mission commanded by Walter Villadei, 26 covers also flew on the Ss2 for the first time, and are likely to remain the only ones flown on a Virgin

Galactic mission for a long time. The covers were stamped at nearby Doña Ana Post Office, New Mexico, 70 km south of Spaceport America, in the New Mexico desert, where the mission started and ended successfully. They bear the signatures of the three Virtute-1 mission crew members: Walter Villadei, Angelo Landolfi and Pantaleone Carlucci, and the handwritten inscription '*Flown into space onboard VSS Unity - Virtute-1 Mission*'.

NICOLA PECILE, THE FIRST ITALIAN TO PILOT A SPACEPLANE

The 'spaceplane' was piloted by Nicola Pecile, born in Udine on 11 March 1973. His is an extraordinary career that has led him to

become one of the world's most renowned test pilots, having flown more than 170 types of aircraft and clocked up 7700 flight hours. He is the only Italian astronaut to have piloted a rocket plane with variable-altitude wings that transforms into a majestic glider on its return from space.

Graduating as a military pilot in 1997, at Sheppard Air Base, Texas, the turning point in his career came in 2001 when he was selected for the **Italian Air Force's Experimental Flight Department at Pratica di Mare**, where he was appointed test pilot experimenter, working on a wide range of fixed- and rotary-wing aircraft. His experience and skills in the field of aviation allowed him to obtain a degree in **Astronautical Engineering from**



» Walter Villadei received by the President of the Council of Ministers, Giorgia Meloni, after his flight into orbit on the Axiom-3 mission in January 2024.

the School of Aerospace Engineering at La Sapienza University in Rome.

In 2011, he decided to retire from the Air Force, which he left with the rank of lieutenant colonel, and move to the United States to join the **National Test Pilot School in Mojave, California**, as a test instructor. Here he also acted as Director of Flight Operations for almost three years.

In September 2015 he took on a new professional challenge, joining a group of seven test pilots employed by Virgin Galactic, until the highly successful mission on 29 June that made him an astronaut.

Virgin Galactic currently employs eight pilots, all test pilots with similar previous experience.

Prior to this programme, only eight pilots in aerospace history had manually piloted a vehicle at the same altitude, in the 1960s (the

then X-15 programme, *see page XX*) and two had done so in 2004 with *SpaceShipOne*, which was *SpaceShipTwo's* technical demonstrator.

In an interview after his return from the historic mission, he told us:

“In September I will have been with Virgin Galactic for eight years. I joined at a time when there was very little flying and a lot of engineering work to be done. As an engineer, I did a great deal of work on the development of this vehicle, particularly Unity and then the others. I am the flight science team’s assigned pilot. It is important for designer-developers to have a reference pilot. Here at Virgin each pilot is assigned to a discipline and I am in charge of flight controls and aeromechanical flight conditions.”

“For me it was good to see what I worked on growing and then to see

and feel the final product, including from an engineering point of view. It has been a very interesting journey. Of course, a fundamental role in my training was played by the Air Force, where I started my career, and I owe it everything from a training point of view. Those were unforgettable years. It was not an easy choice for me to leave Italy and come here to take up this great opportunity in a country that, with all its strengths and weaknesses, remains a bastion of values where hard work bears fruit. I started from nothing and today I am at the controls of a spacecraft. It has certainly been a rewarding journey.”

AND WHAT DOES THE FUTURE HOLD FOR US?

“We are at the start of future commercial spaceflight, a new chapter, activities that will, sooner or later, be within the reach of the vast majority of people, in the same way that commercial aviation was launched a hundred years ago. I like to compare what we do today to the Atlantic crossings of the 1920s. In a hundred years time, flying in space will be normal and affordable for everyone, just as flying in an aeroplane in the United States or Australia is today.” [NSE](#)

* **Umberto Cavallaro** is President of Asitaf (Associazione Italiana di AstroFilatelia). A popular astronautics historian, he translated NASA astronaut Walter Cunningham’s autobiography *The Moon Boys* into Italian.