Bruce McCandless and "Bavaria One"

Compiled by Joachim J. Kehr, Editor SpaceOps News (August 2020)

The Challenger shuttle mission STS-10 (41B) was launched on Feb 2nd ,1984 from KSC and lasted until Feb 11th. The Challenger landed after 127 orbits the first time on the new 4km runway at Kennedy Space Center, Florida.
The task of the mission was to launch the two communications satellites Palapa B2 and Weststar 4, but the two assigned PAM engines (Payload Assist Module) did not work and the satellites got stranded in a useless orbit. They were later recovered by another shuttle mission and used again.
In addition a SPAS Satellite (Shuttle Pallet Satellite) also carried in the payload bay, could not be released because of a malfunction of the manipulator arm, however - the two outboard maneuvers performed by Bruce McCandless and Robert Stewart were *brilliant*. [1]

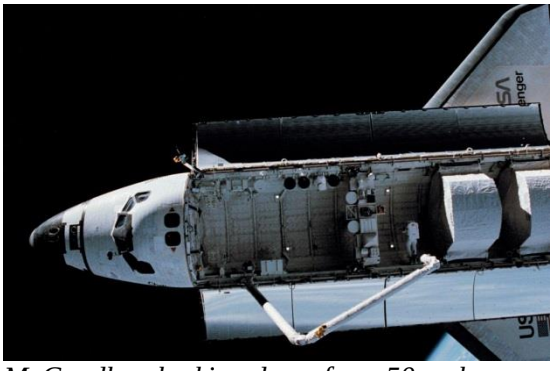
"Bavaria One": In October 2018 Soeder, the incumbent Bavarian Prime Minister, declared the "Bavaria One" program was to promote a look into space, "but not to look for aliens, but to better understand the Earth." Specifically, Soeder promised funding of 700 million euros at the time to support future technologies in the aerospace sector. [2]
"Bavaria One" even defies the current Corona pandemic (status August 2020), in fact the list of planned projects is long. Ranging from satellite geodesy to new space start-ups, the Free State has big plans [3].

Bavaria's Finance Minister Markus Soeder in his Munich office. A photo of Bruce McCandless is displayed there. At times, the minister confesses, he feels like an astronaut himself.
Source: Quirin Leppert. [3]

The Corona crisis should not change that. The promised 700 million should continue to exist, according to the state chancellery, just not immediately, but over the next eight years [2].
Coming back to the role of McCandless: Prime Minister Soeder describes himself as a "fan of astronomy". He is also an enthusiastic supporter of "Star Wars" and "Star Trek".
During the 20th anniversary celebration of the D-2 mission at German Space Operations Center (GSOC) Soeder confirmed his enthusiasm again by admitting that his Minister's office prominently featured the iconic image of McCandless suspended untethered in space.

The MMU mission : [1]
After failing to deploy the two communication satellites, the Challenger astronauts had much success with their long-prepared outboard maneuvers on the 5th and 7th day of the flight, in checking out the MMU (Manned Maneuvering Unit) for the first time. The unit was developed by Martin Marietta over many years for approximately ten million dollars. This new mobile device was intended to give the American astronauts more freedom of movement and, above all, a greater range during their outboard activities in Earth orbit, e.g. catching or repairing defective satellites.
This jet-propelled "back-pack" is a small spacecraft of its own with orientation- and attitude control systems, communication- and video systems. The two MMU devices built so far allowed use of up to 6 hours "flight" and could be refueled in the Orbiter cargo bay. The controls for the astronauts were located on the two protruding armrests. Rotation and up- and down movement of the MMU are controlled on the right, forward and backward movement on the left. The commands were executed by twelve small gas nozzles, each with 7.6 N thrust, which briefly enabled a maximum speed of 20 m per

second or 70 km per hour in one direction.
A command to maintain a certain position in space could also be entered. Everything was controlled by a powerful mini-computer. The MMUs were transported in the Orbiter cargo bay on the left and right next to the airlock door. McCandless played a major role in the development of the heavy, 154 kg MMU device. So he and his crewmate Robert Stewart were given the chance to check out the apparatus in space (in situ) for the first time.
With their regular spacesuits the men left the Orbiter cockpit and McCandless first "put on" one of the MMU devices, but despite Stewart's help, he needed almost an entire orbit to adjust himself to the device and get strapped in. But then the astronaut floated up out of the bay and, on the first attempt, moved away from the Orbiter totally untethered for 50 m and then for 100 m.



McCandless looking down from 50m above at the payload bay and his crewmate Bob Stewart at the end of the manipulator arm. (NASA) [4]

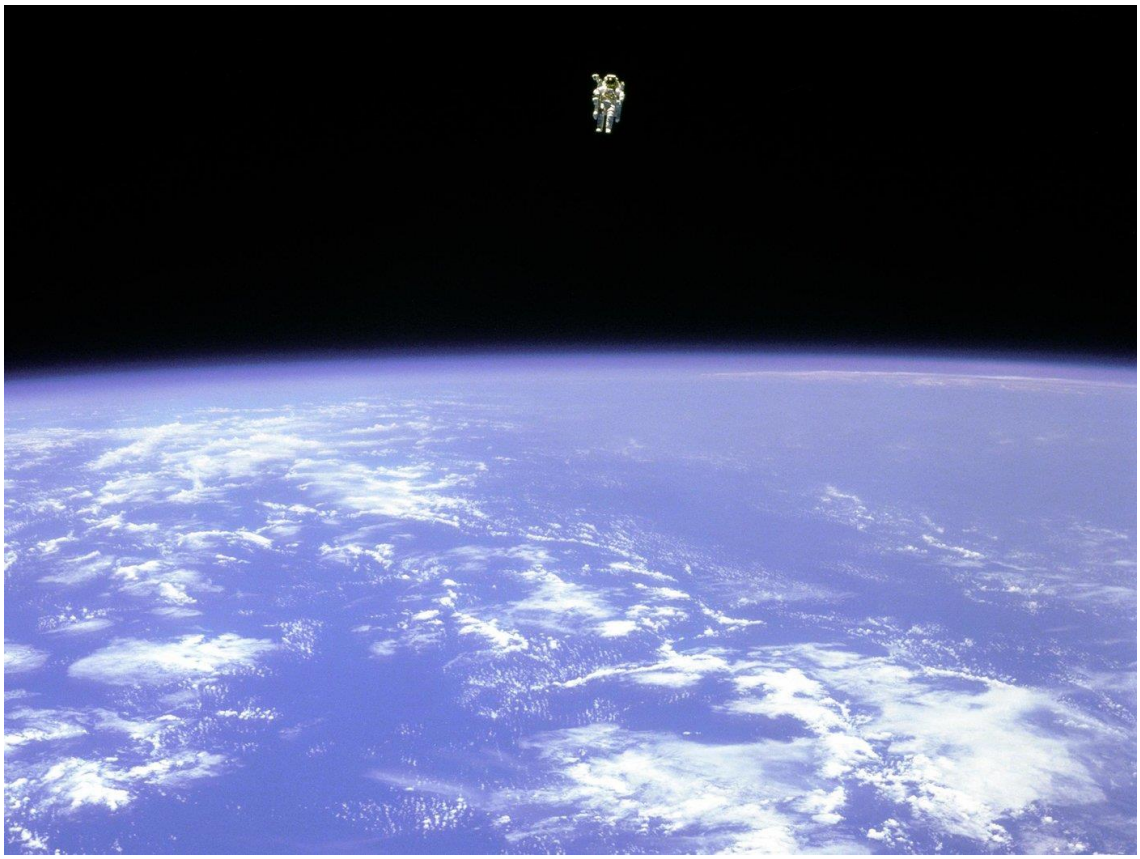
The crew in the cockpit got extremely impressed by the performance of their crewmate, who floated in his "white-knight armor" in front of the dark sky and 400 km above the slightly curved blue and white Earth.

The TV broadcast of these maneuvers was spectacular, as were the photos and films later published. After mastering some minor problems in the MMU jet controls, McCandless returned to the Challenger cargo bay.

There he first got anchored to the small platform attached at the end of the Shuttle manipulator arm to act as a realistic piece of mass for a typical sequence of movements, which would during the next shuttle mission (STS-41C or SM11) be required to repair the defect Solar Maximum Mission (SMM)-satellite. Then McCandless unstrapped the MMU and returned to the Challenger cockpit together with Bob Stewart. Their EVA had lasted almost exactly six hours.
During the two men's second outboard maneuver, Ron Stewart took over the active role with the MMU, while McCandless helped and secured him. The planned experiments also included the rendezvous of a “MMU-astronaut” with the German SPAS-satellite which was carried in the shuttle payload bay. Due to a slight glitch the manipulator arm could no longer be moved correctly and the target could not be lifted out of the cargo bay. But the shuttle crew spontaneously developed replacement procedures with which the stabilization of a moving target satellite by the astronaut in the MMU could be simulated.
Finally, the possibility was tried out to capture an accidently floating away astronaut to be pulled to safety into the cargo bay by another crew member with the MMU. The astronauts also caught a footrest floating away unplanned, with quick reactions and skillful body-actions, supported by pilot Vance Brand maneuvering the Challenger.
In the middle of this action, the pre-planned phone call with US President Reagan could be performed successfully as well. At the end of their EVA the two astronauts made a few more refueling tests in preparation for supplying burned-out satellites in low Earth orbit. Fueling of the MMU was also rehearsed several times in the Orbiter cargo bay. Just like the first EVA, Stewart and McCandless' second “space-walk” lasted almost exactly 6 hours, then they returned to the Challenger cockpit having successfully completed the MMU test series.
McCandless described his experience: [4]
“I was grossly over-trained. I was just anxious to get out there and fly. I felt very comfortable ... It got so cold my teeth were chattering and I was shivering, but that was a very minor thing. ... I'd been told

of the quiet vacuum you experience in space, but with three radio links saying, 'How's your oxygen holding out?', 'Stay away from the engines!' and 'When's my turn?', it wasn't that peaceful ... It was a wonderful feeling, a mix of personal elation and professional pride: it had taken many years to get to that point" [5]

McCandless passed away in 2018 at the age of 80.
By indirectly acting as "patron" for "Bavaria One" however, he literarily inspired the young generation to keep on trying to carry out the unthinkable.
On a personal note, I think the McCandless image contributed as much to ignite interest in spaceflight as the pictures of the first Moon landing. For us young engineers at GSOC– having entered the world of space exploration at the 1970s after the moon landing, the successful shuttle flights, the first spacelab mission with German astronaut Ulf Merbold, and finally the first "free flight" in space by McCandless - everything seemed possible. That was 40 years ago and a lot of set-backs have happened since then – but as described before, the magic of McCandless' image is still alive.



Bruce McCandless "flying" untethered above the Earth the infinite Universe all around him (image NASA) [4]

References:
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