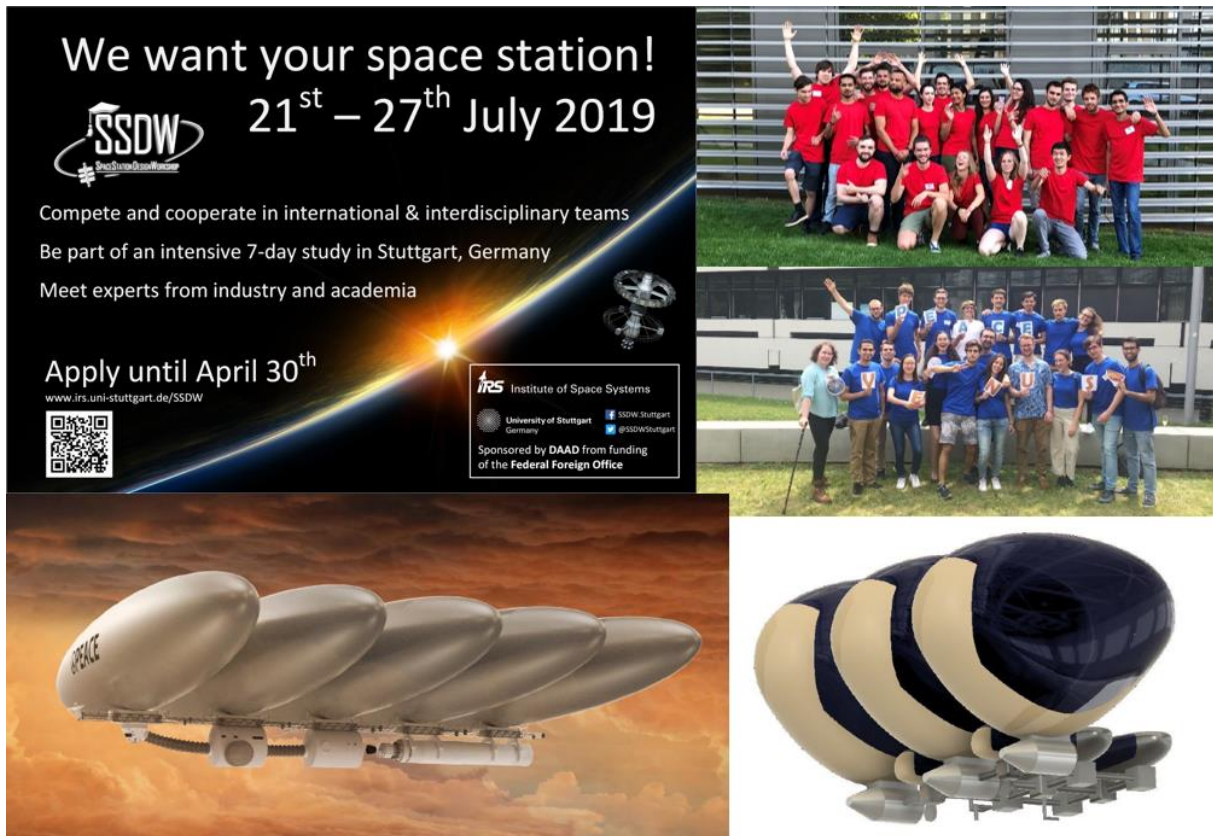


Overview of past workshops and results

2019 IRS, Universität Stuttgart, Germany

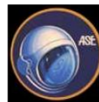


Top left: SSDW 2019 poster; Top right: SSDW 2019 participants; Bottom: design results (left: Team BLUE, right: Team RED)

From 21st to 27th of July 2019, 40 students and young professionals followed the invitation of the Institute of Space Systems of the University of Stuttgart to the Space Station Design Workshop (SSDW) 2019. Within one week, the two interdisciplinary teams composed of 20 international participants, supported by experts from industries and universities, tackled the challenge of performing a conceptual design of a permanently manned habitat inside the Venusian atmosphere. Primary objectives of the concept were the provision of infrastructure for the crew and scientific experiments to better understand the Venusian surface and atmosphere. Furthermore, In-Situ resource utilization was integrated as much as possible to minimize expensive Earth-Venus cargo transport.

The workshop begun with the SpaceUp Stuttgart 2019 as a kick-off event. This unconference and the whole week of the workshop would not been possible without the commitment of individuals, sponsors and supporters. Therefore, the Institute of Space Systems would like to thank again all parties for their efforts.

Sponsors and Supporters 2019:



2018 IRS, Universität Stuttgart, Germany



Top left: SSDW 2018 poster; Top right: SSDW 2018 participants; Bottom: design results (left: Team BLUE, right: Team RED)

From 22nd to 28th of July 2018, 40 students and young professionals followed the invitation of the Institute of Space Systems of the University of Stuttgart to the Space Station Design Workshop (SSDW) 2018. Within one week, the two interdisciplinary teams composed of 20 international and interdisciplinary participants, supported by experts from industries and universities, tackled the challenge of performing a conceptual design of a permanently manned habitat in the South Pole area of the Moon.

The workshop and the SpaceUp would not have been possible without the commitment of individuals and the support from sponsors. Therefore, the Institute of Space Systems would like to thank Astos Solutions, Christian Bürkert Stiftung, TESAT Spacecom and Valispace.

The technical program was accompanied by team building events and social activities such as the Design Thinking session on Sunday or visits of the local Planetarium and the city center on Monday and Tuesday.

Sponsors and Supporters 2018:



University of Stuttgart
Germany



christian bürkert  stiftung

2017 IRS, Universität Stuttgart, Germany



Top left: SSDW 2017 Poster; Top right: design results (upper: Team BLUE, lower: Team RED), SSDW 2017 Participants

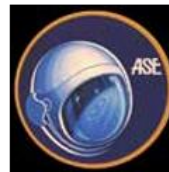
For the first time in its history, the SSDW 2017 challenged its participants with a mission statement aiming for Mars: As employees of the fictive private company called Exploration and Development Enterprise (EDEN) both teams formed two individual Mars-Task-Forces with the assignment to survey and investigate different options to establish an international human tended platform in the vicinity of Mars. After performing a trade-off study of different mission scenarios, a comprehensive study of the selected scenario was carried out.

After 2016, the SSDW started with a very successful SpaceUp unconference with over 100 participants from industry, academia and agencies. The SpaceUp ended in the late afternoon with the launch of water bottle rockets, constructed within one hour by the SSDW participants.

The workshop and the SpaceUp would not have been possible without the commitment of individuals and the support from sponsors. Therefore, the Institute of Space Systems would like to thank Airbus Defense and Space, Association of Space Explorers, Astos Solutions, HE Space, and TESAT Spacecom.

The technical program was accompanied by team building events and social activities such as the spaghetti-marshmallow challenge or night outs in Stuttgart. These activities supported both the motivation of the participants and the teamwork.

Sponsors and Supporters 2017:



2016 IRS, Universität Stuttgart, Germany



*Top left: SSDW 2016 Poster; Top right: design results (upper: Team RED, lower: Team BLUE)
Bottom: SSDW + SpaceUp participants & staff*

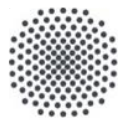
It's the year 2025 – the ISS is coming to the end of science operations. No successor station has been established so far. The journey to Mars is a vision of the future. To make it happen, the technology of in-situ resource utilization must be addressed primarily. In addition to enabling sustainable deep space missions, ISRU on the Moon shall be used to re-supply current spacecraft and demonstrate new technology for upcoming Mars missions. Hence the SSDW 2016 investigated the opportunities of on-orbit manufacturing and resource processing on board a space station in cis-lunar space.

The SSDW started with a SpaceUp unconference at the IRS. Amongst the 100 participants were leading experts from ESA and DLR, SSDW candidates, local students and professionals from Stuttgart and visitors from all over Germany. The workshop and the SpaceUp would not have been possible without the commitment of individuals and the support from sponsors. Therefore, the Institute of Space Systems would like to thank Airbus Defense and Space, Astos Solutions, OHB, the ISS Crew, HE Space, TESAT Spacecom and ThalesAlenia Space.

Again, two competing teams developed concepts for the next space station. The international and interdisciplinary aspect of the workshop was addressed again with 40 participating students and young professionals from all over the world with diverse backgrounds in engineering, biology and economics. For the first time in the history of the SSDW, two inner architecture students enriched the concepts with a new perspective on the design of a human-rated platform in space.

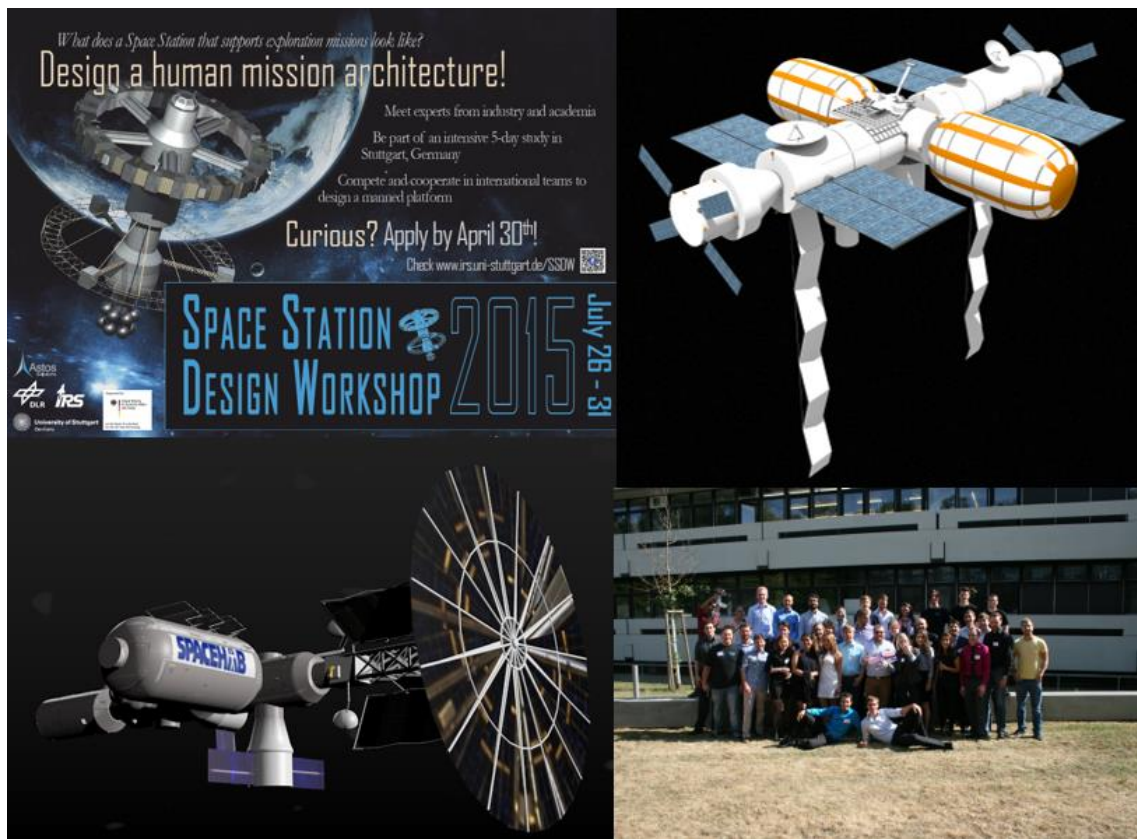
The technical program was accompanied by team building events and social activities such as the spaghetti-marshmallow challenge or night outs in Stuttgart. These activities supported both the motivation of the participants and the teamwork.

Sponsors and Supporters 2016:



University of Stuttgart
Germany

2015 IRS, Universität Stuttgart, Germany



SSDW 2015 participants & staff, design results (left: Team RED, right: Team BLUE), SSDW15 Poster

Operations concerning the moon, libration points, asteroids, and near planets such as Mars are all considered significant objectives towards the expansion of human space exploration. As an important step in this process, manned platforms in Earth's proximity may be used to support exploration missions as well as long-duration microgravity research. Hence, the SSDW 2015 looked at the cis-lunar space in order to establish a long term human presence in the Earth-Moon vicinity, while leaving the decision about the specific purpose of the space station up to the two teams.

After a five-years break, the SSDW was held again at the Institute of Space Systems and challenged the participants with a wide-ranging task in an interdisciplinary setting. The workshop would not have been possible without the commitment of individuals and the support from sponsors: the German Aerospace Center (DLR), Astos Solutions, TESAT Spacecom, ThalesAlenia Space, OHB and the Federal ministry for Economic Affairs and Energy.

32 students and young professionals from all over the world with diverse backgrounds in engineering, physics and economics were selected to take part in the Space Station Design Workshop 2015. Two competing teams developed concepts for a multi-purpose platform with a modular design and public-private-partnership engagements.

The technical program was accompanied by team building events and social activities such as an egg-dropp challenge from the IRS roof or night outs in Stuttgart. These activities supported both the motivation of the participants and the teamwork.

Sponsors and Supporters 2015:



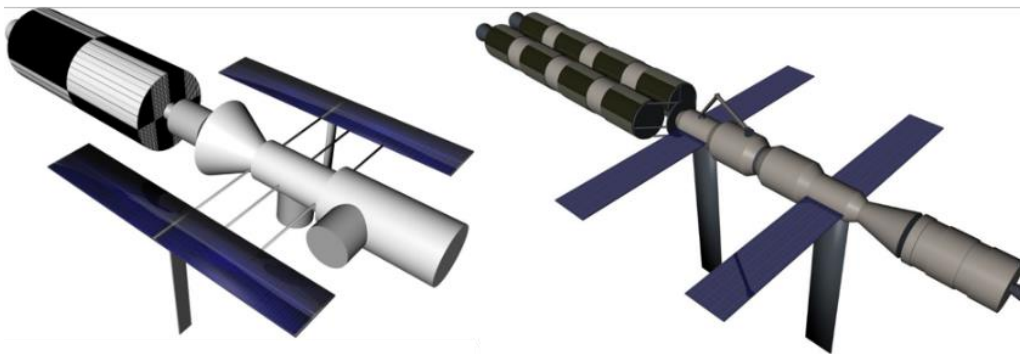
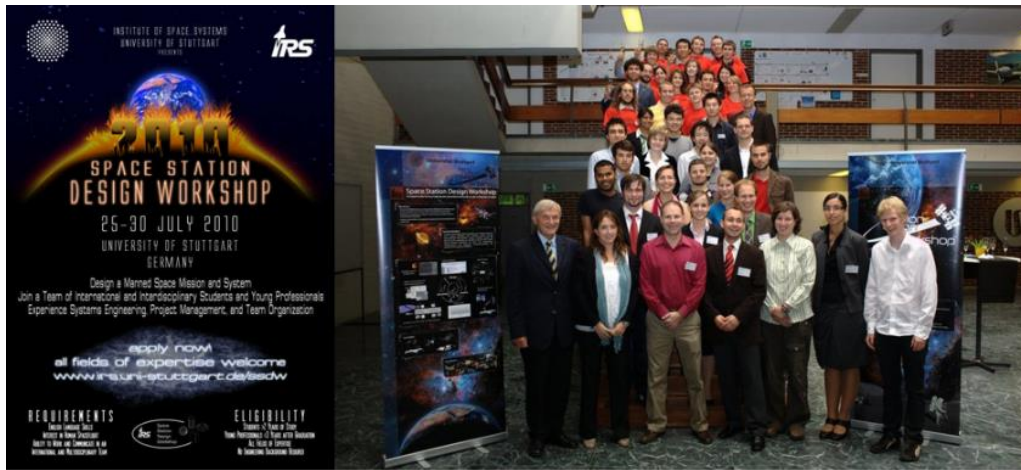
Supported by:



on the basis of a decision
by the German Bundestag



2010 IRS, Universität Stuttgart, Germany



Top left: SSDW 2010 Poster; Top right: SSDW 2010 participants & staff; design results (left: Team BLUE, right: Team RED)

Near-Earth Asteroids (NEA) have become a subject of major interest over the past years. Studies have dealt with deflection and mitigation strategies for asteroids with a possible impact on Earth. But also from a scientific point of view, asteroids are very attractive objects as they may contain a lot of information on our solar system. The constant evolution of the Space Station Design Workshop made it possible of going one step further and providing the necessary environment for students to design an interplanetary mission.

Once again, the SSDW was held at the Institute of Space Systems and confronted the participants with a challenging task in an interdisciplinary and intercultural setting. The workshop was enabled by the contribution of individuals and the support from sponsors: the European Space Agency ESA, the "Stiftungen Landesbank Baden Württemberg", EADS Astrium and the Planetarium Stuttgart.

32 students and young professionals from 12 nationalities with diverse backgrounds in engineering, physics and economics were selected to take part in the Space Station Design Workshop 2010. Two competing teams developed distinct concepts for the human exploration of asteroids. Both teams presented a concept with very distinct designs for the propulsion system to address the mission statement.

The technical program was accompanied by team building events and social activities such as a visit to the Stuttgart Planetarium or nights out in Stuttgart. These activities supported both the motivation of the participants and the teamwork.

The SSDW has experienced an increasing international and professional response and interest in the workshop. Especially the systems engineering aspect in the education of engineers has been found not to be represented sufficiently in academic programs. One of the purposes of this workshop is to provide a practical approach to systems engineering and contribute to the training in this field. The results of the workshop are valuable input for studies at IRS as well as ongoing work at ESA and international groups.

Sponsors and Supporters 2010:



Planetarium
Stuttgart



LB BW
Stiftungen
Landesbank Baden-Württemberg

2009 IRS, Universität Stuttgart, Germany



Top left: SSDW 2009 poster; Top right: SSDW 2009 participants & staff; Bottom: design results (left: Team RED, right: Team BLUE)

When following the development and evolution of the Space Station Design Workshop in the last few years, you should have noticed the emergence of the design tasks beyond low Earth orbit and typical space station activities, but involving many aspects of human space exploration like transportation and staging to new destinations. Likewise, the methodology and tools involved have been extended and updated, allowing the SSDW 2009 for the first time to investigate human presence on another planetary body, our Moon.

Returning to our home campus at Stuttgart University, the SSDW team introduced an even more challenging task to the interdisciplinary and international participants. However, all of this would not have been possible without the support from sponsors and contributing individuals, namely the Concurrent Design Facility (CDF) of the Faculty for Aerospace Engineering, the European Space Agency ESA, the "Stiftungen Landesbank Baden Württemberg", the "Robert-Bosch-Stiftung", Habitats for Extreme Environments (HE-Squared), Ms. Irene Lia Schlacht (TU Berlin), Smart Technologies, and the Planetarium Stuttgart.

Out of a significantly larger pool of applications, 31 students and young professionals were invited to the SSDW 2009, coming from 11 nationalities worldwide and with backgrounds not only in aerospace engineering, but also architecture, psychology, physics, and other engineering

disciplines. In two competing teams the participants were tasked with the development of an international lunar base concept to be completed until 2025 for extended human presence of up to 180 days. Both teams developed very different solutions, placing their base infrastructure at polar (Team BLUE) and equatorial (Team RED) locations, and involving diverse subsystem technologies to cope with the specifics of each environment.

The SSDW 2009 took advantage of the newly acquired infrastructure of the Concurrent Design Facility of the Faculty for Aerospace Engineering of Stuttgart University, supervised by Johannes Gross, providing excellent working environment for both teams in their local design team rooms. Outside of the technical program, social events like a welcome dinner, a visit to the Stuttgart Planetarium, and evening excursions into the Stuttgart nightlife contributed to the constant motivation of all participants.

The international and professional response to and interest in the SSDW 2009 results, both of value for the IRS as well as ongoing ESA and international design work, confirmed once again the value of the SSDW approach. Work on the technical results will continue in the future, while staff is already working on the preparation for SSDW 2010.

Sponsors and Supporters 2009:

Planetarium
Stuttgart



LB BW
Stiftungen
Landesbank Baden-Württemberg



Robert Bosch **Stiftung**

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