Research meets Adventure . . .
or How to Soar the Himalayas

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One MWP goal during their Himalaya mission was to create a 3D terrain model of the mountain areas where glaciers, avalanches, mud slides and flash floods produce dangerous threats to those who live in the valleys below. Those massive ridges are extremely difficult to access, and satellite pictures cannot provide the information needed to monitor the complex terrain and estimate their potential risks. While soaring over the breathtaking landscape, DLR's high precision 3D cameras were able to capture detailed pictures of mountains, glaciers, valleys and even small rocks. As a result the mosaic created has been assembled into an accurate view of the monitored areas.

Pilots who have tried mountain soaring know about their fascination and have perhaps experienced some of their dangers. Many famous mountain gliding sites offer great conditions, and local pilots will give valuable advice to 'newbees'. But what about the Himalayas? Mountaineers have climbed the highest peaks on Earth, but has anybody tried to soar them yet? Sounds like a thrilling adventure, maybe one of the last secrets to be discovered on our planet.

The Mountain Wave Project (MWP) is a small group of adventurers… Excuse me, of course they are far more than that: MWP's members are reasonably experienced and ambitious 'soaring scientists' who try to live their passion but are at the same time a group of dedicated researchers. But for sure, they don't lack any spirit of adventure.

MWP's goals follow past expeditions of the 1950s. The Sierra Wave Project founded by the German wave pioneer and record pilot Dr. Joachim Kuettner found out why and where (sometimes dangerous) rotors were setting up in the atmosphere above the North American continent.

With greater knowledge and more modern equipment, MWP continues the exploration of waves and rotors around the world. While soaring different mountain ranges, MWP's pilots have collected data and learnt more and more about atmospheric phenomena. Of course, the more you get acquainted with your invisible partners, the better you are able to chase records.

MWP'S HISTORY AND EXPEDITIONS

In 1998 in the Serres (France), pilots René Heise and Klaus Ohlmann founded the non-profit MWP, which became part of the scientific and meteorological panel of OSTIV. Their first expedition to the Andes in Northern Patagonia (Argentina) was launched in November 1999. A motor glider Stemme S10 VT served as their research platform for this outstanding expedition. Prior to this few European pilots had ever tried to soar the Earth's longest mountain range. One of MWP's goals was to attempt a 2000km straight distance flight so as to win OSTIV's Kuettner-Prize.

During this first expedition Klaus Ohlmann achieved a 1550km straight flight, but unfortunately experienced logger problems… However after testing new high resolution weather forecasts and measuring the vertical move of air mass in waves, MWP's research crew was now ready to provide better weather data for pilots planning to fly new dimensions.

During a subsequent MWP mission in the spring of 2003 to Serres (French Alps) and to Jaca (Spain) on the leeside of the Pyrenees MWP's pilots conducted measurement flights in wave in the Provence and tried several wave flights in stormy conditions in the lee of the Pyrenees. Later that year Klaus Ohlmann returned to the Andes where, on November 23, he flew the legendary 2,123 km straight line flight from El Calafate to San Juan. He won the prestigious Kuettner Prize being the first glider pilot to fly a 2,000km straight line wave flight. Klaus also set the mark for the longest soaring flight of all times - around several turn points (3,008km).

In 2006 two MWP members participated in the "Terrain Induced Rotor Experiment" (T-REX) in the Sierra Nevada (USA) René Heise served as scientific reviewer for the National Science Foundation and contributed MWP wave forecasts to their data archive. Wolf-Dietrich Herold documented the group's activities in Boulder (USA) and in Bishop (USA).

The third official MWP mission in November 2006 was to again focus on waves and rotors over the Andes. Invited by the Argentinean Air Force to their base at Plumerillo airport near Mendoza, MWP's soaring scientists explored the highest region of the Andes around Aconcagua (22,837ft). A wave climb up to 41,000ft delivered a comprehensive wind profile for the altitude range covered. It was the first scientific turbulence measuring exercise over the Andes. MWP could thus draw a 3D model of the winds and the turbulent kinetic energy up to the stratosphere. Their recorded wave data over the southern Andes provided invaluable safety data for commercial aircraft crossing the mountains and not to mention ambitious glider pilots as well.

HIMALAYAS

MWP expedition No. 4 was different: this time the aim was not only higher but also somewhat more complicated to achieve. The Earth's highest mountain range was calling; uncharted terrain for glider pilots, high mountains located in a politically difficult and culturally complex environment. A sacred mountain range extending from west to east - was not really opposing the prevailing westerly winds.

Before going into the details of the 2013/14 expedition, some readers might know that an expedition had actually been to the Himalayas before. In 1985, long before the world had loggers, internet, e-mail, cell phones, high end cameras and portable computers available, Dr. Joachim Kuettner, then 76 years old, participated in the 'First Himalayan Soaring Expedition' to Nepal. Organised by the Spanish glider pilot Alvaro de Orléans-Borbón and equipped with a powered glider a 'Valentin Taifun 17 E', a team of international scientists analysed the circulation of katabatic winds and updrafts in the Kali Gandaki Gorge, the world's deepest gorge, which stretches out from north to south through the Himalayas, forming a wind tunnel. Alvaro de Orléans-Borbón wanted to find out about daily exchange rates of air mass from the plains at ~3000ft above sea level to the highest terrain (13,000 to 26,000ft asl). Every day, the anabatic winds in the gorge reach speeds up to 40kts, not to forget strong gusts!

Above: An expedition of some magnitude - 10,000 kms - different climate zones cultures and continents
Below: First flight along the massive Annapurnas - checking the conditions and the MWP's equipment

Above: 1958 - The first Himalayan Soaring Expedition to Nepal, organised by Spanish glider pilot Alvaro de Orléans-Borbón and equipped with a powered glider - a 'Valentin Taifun 17 E'
Below: Behind the scenes - Preparing a mission at Pokhara

HOW TO GET THERE?

In 2007, geo-scientist René Heise who works with the Geoinformation Centre of the German Air Force, first came up with the idea of re-exploring the Himalayas in a glider. His soaring career started as a young boy, and while competing at national and international competitions he served as meteorologist for Germany's national soaring team. When working in Uzbekistan and Afghanistan he had studied the weather conditions en route for pilots to fly over there from Europe and out to the western Himalayas. Later while returning from the Russian Gliding Championships south of Nowosibirsk, René dreamt of exploring unknown terrain.

After giving a talk on the MWP Andes expedition in Berlin, the Chinese military attaché addressed him and encouraged René to try soaring the Himalayas. Three years later, in 2010 MWP was invited by the Chinese 'Academy of Science' to visit the Institute of Tibetan Plateau Research in Lhasa (Tibet).

René and Klaus stayed some extra-days to explore Tibet's Plateau, and of course they found some rotor clouds decorating the skies where the high mountains kiss the troposphere. A cu-cloud base reaching 10,000ft agl (23,000ft msl) looked fascinating as well.

René then continued studying weather, cloud base and general climate conditions in the area. Not much data was available from the Himalayas, but satellite pictures raised hope for thermals and wave above the north-south aligned valleys. Following a Himalaya wave forecast model over a year, René found many interesting locations in smaller north-south valleys in the Himalayas. He considered Xigaze, a city about 200 km north of Mt. Everest, as an expedition base, but the security situation in Tibet looked challenging.

He decided to start with Nepal on the other side (south) of the Himalayas. At least both countries would now have an idea of MWP's intentions, and hopefully trust their plans.

However, before travelling 10,000km far out east, a lot of questions had to be answered. No less than eight different Nepalese governmental departments had to give permission for MWP's plan. Which glider would be available, how would it best get there and how would MWP be able to finance such a project?

In October 2011, project leader René travelled for a first official business visit to Kathmandu where he consulted the Ministry of Foreign Affairs and ICIMOD (International Centre for Integrated Mountain Development).

A lot of paperwork followed and two years later 80% of the authorities had agreed to MWP's plan. In 2013, the pilots were invited to present their program in Kathmandu.

By then a long list of different projects had jumped on the bandwagon to the Himalayas: the DLR (German Aerospace Centre), the German Air Force Centre of Aerospace Medicine, Karlsruhe's Institute of Technology and the University of Aachen all had developed exciting research programs.

Partnering with MWP, their idea was to use the glider as a research platform. During a long talk in front of Nepal's Ministry of Home Affairs and the Ministry of Tourism and Aviation in Kathmandu, MWP explained about the proposed research projects, which covered many different branches of study.

1. Further research in waves and rotors (atmospheric movements) to be able to forecast hazards for aircraft.
2. Pollution measurements,
3. Examining physiological effects on aircrews operating at high altitude,
4. Testing a 3D-capable aerial camera for surveying extreme terrain.

The audience was thrilled, and MWP was assigned ICIMOD in Kathmandu as the local partner. The entrance ticket from dreaming to reality!

DESTINATION NEPAL

On October 13, 2013, Klaus Ohlmann's Stemme D-KKOP took off in Strausberg (east of Berlin). His friend Anssi Soila served as a valuable crew member on their trip through Europe and Asia, an adventure worth another huge story. During the 2014 German soaring convention Klaus gave a thrilling talk about how they got halfway around the world, managing energy and time in a powered glider, crossing borders, mountains, seas and meeting with all kinds of different cultures. One of the biggest challenges was their 900km trip across the Gulf of Oman, where the engine made strange noises and the portable navigation device did not work properly. After a long and exciting journey they arrived in Kathmandu on November 1.

René explains, "From the very beginning, it was obvious that it didn't make sense to try the journey overland. Crossing different climate zones with a motor glider would be quite a trip, but I knew crossing India by car and trailer with their never ending custom procedures would have become more than an issue." When Klaus and Anssi arrived, they still needed two Nepalese signatures, necessary to accomplish the MWP Himalaya plan.

Sidonie Ohlmann and Jona Keimer, a student at Aachen's University, arrived ten days later on November 11 with the second Stemme, the research ship which was to be equipped with pods to carry all kinds of measurement technique and the valuable 3D cameras. This glider is owned by the Faculty of Aerospace Technology of Aachen's University.

To their dismay it was election time in Nepal, and all authorities were closed for a considerable time. Klaus, Jona and Sidonie started their 'relocation' by participating in a local VFR seminar. November, is Nepal's best flying month with clear skies, first class visibility and very little cloud. The crew enjoyed days of sightseeing and ground exploring, but no flying at all. While the research team was busy preparing everything in Pokhara, the pilots could not get the Stemmes to fly over from Kathmandu. At the same time the Polish expedition team involving Sebastian Kawa arrived, and together the Europeans suffered severe frustrations from not being allowed to fly.

In December, whilst the scientists had left Pokhara to fly home, the missing signatures were issued and MWP received a official flying approvals from the aviation authorities.

Klaus and Anssi, who had stayed in Nepal, could now transfer their Stemme to MWP's base camp in Pokhara and finally try their first exploration flights in the Annapurna area. The second Stemme was not transferred until January.

NEW YEAR, NEW HOPE

In January 2014, MWP and the scientific partners returned to Pokhara, full of new hope after the big disappointment. Would it become a Happy New Year?

The first problem to be solved was the fuel question. The Stemmes were of course required to self-launch from Pokhara (in the plains) and then motor over into high terrain. Most missions were initially conducted with engine power and at high altitude the engines needed fuel with a high octane index - i.e. (AVGAS or premium gas). Again MWP was almost running out of time, but luckily somehow the fuel made its way to Pokhara.

After a first successful technical test flight, Jona and René, on January 27, followed the 'historic' Kuettner / Orléans-Borbón route along the Kali Gandaki Gorge. They scanned the area around the airport of Jomsom (8,800ft) with the 3D-camera. Jomsom's airport between the highest mountains in the Himalayas is a challenging place for take offs and landings. The goal was to provide a 3D model which would enable pilots to fly safely between the 26,000ers, even during minor visibility.

Now MWP's members and the partnering scientists got excited. Cheerfully they pulled the instruments out of the pods to see what information had been collected. Some minor problems still needed to be solved. DLR's high precision cameras had to cope with temperatures they had never been tested in, but they soon worked flawlessly. In the end the DLR team returned home with valuable material plus enough work for months ahead. Later, when presenting their 3D pictures to the public, it was obvious that not only mountain rescuers and glacier scientists were impressed by the pictures' quality.

Jona and Klaus conducted further exciting missions: They monitored the area along the Seti Gandaki area where huge landslides often destroy valleys and towns.

A big highlight was their flight above the glaciers near Mt. Everest on January 28. René explains, "It had not been easy to find a day on which the high mountains were not covered by clouds or surrounded by high winds, including dangerous turbulence. But using new wave forecasts with a grid pattern of 2.8 km we could now even find out about local effects." Unfortunately, while flying the area, MWP's pilots were not permitted to glide everywhere and leave Nepalese territory to search for lift, but thanks to their forecasts they learned about weak wave systems originating west of Mt. Everest. They also knew the air would be very turbulent.

Germany's Air Force wanted to study the pilots' blood oxygen saturation in high altitude and therefore tested different sensors on the pilots' bodies. The common fingertip measuring did not work properly at high altitudes and, it turned out, the best place to measure oxygen saturation would be the forehead, which now made it easy to integrate a sensor into jet pilots' helmets.

Not sure if and when anything like this will be available to use for glider pilots.

Fourteen missions, each three to four hours long, were accomplished. Not all of them went smoothly. During his convention talk Klaus Ohlmann showed a short movie where you could see all kinds of small items a flying round his cockpit while approaching Mt. Everest. It was extremely turbulent. Nonetheless both Stemme crews brought tons of pictures, information and data back down to Pokhara. Some movies of the two ships cruising the highest mountains on Earth are available on the internet. Exciting, breathtaking, extraordinary shots!

The Himalaya mission officially ended with a last visit at ICIMOD in Kathmandu on January 29, 2014.

MWP members and partners left the adventurous site to head home. Well, those who followed Klaus Ohlmann's website might have noticed, he enjoyed one last flight over to Mt. Everest a day or two later. During all the missions accomplished prior to this day the air had not been like that he had been dreaming of. But on his last flight his vision was fulfilled – not an MWP goal, just a dream. With the engine shut down the Stemme climbed and climbed and climbed up in smooth air. "You only have to imagine it a 1000 times, and your dream will become true!"

MWP'S FUTURE GOALS

A German TV channel's documentary of the Himalayan mission is available online. It will be translated into English soon. Just watch those glider pilots "from the neighbourhood field" who followed their dreams and enjoyed maybe one of the last adventures on Earth. It is amazing. Years of hard work, skills, fortune, ideas and the love of adventure helped them reach their goal.

René Heise continues his work with past projects. He is currently developing a turbulence forecast with new parameters for aviation. He has monitored outstanding wave flights in different regions of the world over the past years. "The data evaluation of forecasts for non-orographical induced gravity waves suggests that an open class glider can use this weak wave lift for long distance flights over several hundreds of miles. Additionally, stratospheric waves offer new challenges for further research in higher altitudes."

MWP has set up a data base to locate rotors around the world. Dr. Kuettner's research shows that under certain conditions some of them can be really dangerous.

The MWP data base (http://www.mountain-wave-project.com/misc/mwp_globalpositions.html) will enable pilots to discover rotors and wave in their home area or at a place where they intend to travel to. Just three sentences about position (coordinates) lift strength, wave conditions and the rotor height will be helpful. Information can be sent to rene.heise@mountain-wave-project.com

There are still some unknown places to be explored. While planning to go back to the Andes, MWP also considers new uncharted terrain: Kamchatka in Siberia.

Sounds like another exciting place to be discovered !

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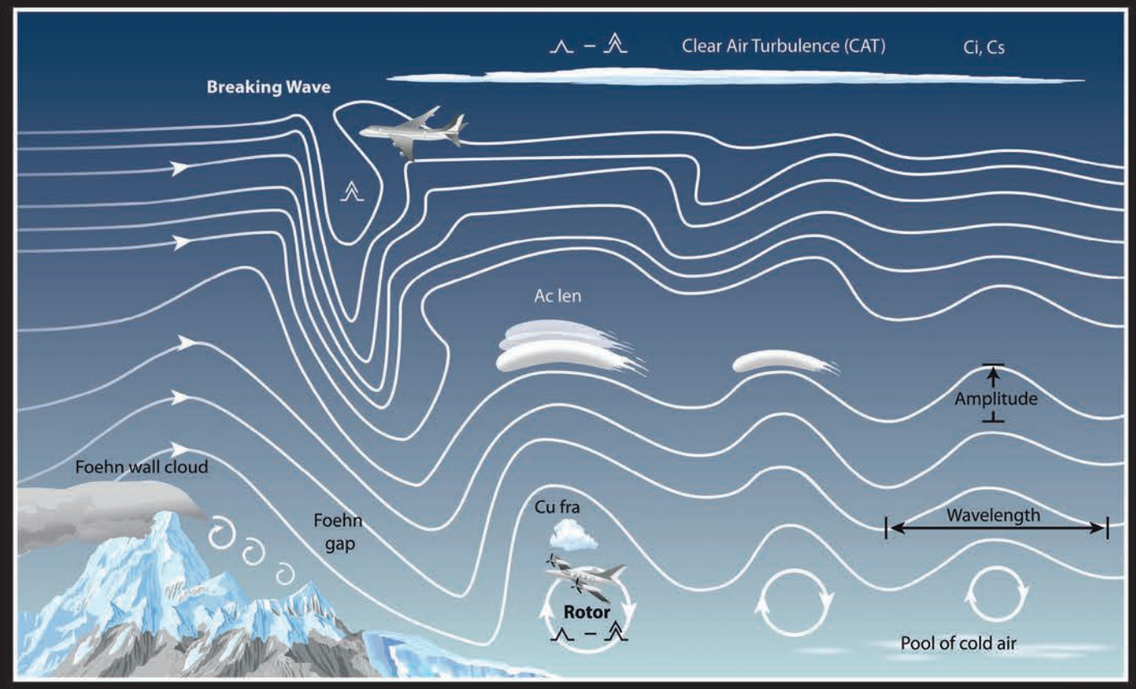

Above: A schematic of the wave structure, surveyed and measured after many expedition flights
Below: Klaus Ohlmann and Rene Heise (wearing a blood sensor) prepare for take-off.