

## 28<sup>th</sup> GHz-Conference Dorsten

Approximately 190 GHz-fans from DL and the surrounding countries have now already met for the 28<sup>th</sup> time on 12<sup>th</sup> of February 2005 in Dorsten. "Exotic" guests were among others such well-known GHz DXer as OZ1FF and LA0BY who had travelled despite the less than ideal weather.

The meeting had again organized by the OV (regional group) Herrlichkeit Lembeck, N38, in co-operation with the District N and the VHS Dorsten.

After the opening address by the conference chairman Peter Hoerig, DL4BBU, and the already traditional introduction of all participants the conference did not continue as is customary – with the presentation of awards to the winners of the previous year's VHF/UHF-Contests.

With good reason the organizers of the conference, DJ6XV and DL4BBU, led off with a kind of "principle discussion" on the future prospect for the conference. The principal reason for this approach was that on 15<sup>th</sup> of January only one speaker has been identified and only one contribution to the planned conference proceedings had been received. The organizers interpreted this as possible indication of a general lack of interest in the conference. This value of continuing to hold special GHz conferences in the future had already been a discussion topic during the previous year's meeting. However, the organizers' appeal to support the conference by submitting papers appeared to have fallen on deaf ears, a possible sign that interest in the conference appeared to continue to wane.

Renewing the question as to the value of holding the conference in the future, triggered an active discussion among the participants. It became clear that the time of the "revolutionary home building of projects" so prevalent during the eighties and nineties is a thing of the past. As the fundamentals of microwave engineering have for the most part been "invented"! What remains is the application of commercially available module technology in order to develop GHz stations. There was, however, agreement that a considerable need does exist for the passing on of experience with the application of this module technology for which the Dorsten GHz conference should be the appropriate forum in the future. Also, lectures on operating technology (e.g. rain scatter) and contest experience were desirable in order to disseminate such information widely. Naturally, the conference should continue to provide the forum for personal interaction and information exchange because this has traditionally been maintained in Dorsten since the appropriate premises are available and there is less commercial activity, such as is common at other conferences. Another plus of the conference is that – new GHz projects are discussed first in Dorsten!

In conclusion all microwave enthusiasts present wished for a continuation of the conference. The lecture programme was felt to be important and should be maintained as it was felt that without this "framework" the conference stood to lose the claim to define the technical standard on the microwave bands.

After this discussion the first expert (Referent) of the so called "VHF/UHF/SHF-Referat" (the meaning of "Referat" is 'department') of the DARC Hellmuth Fischer, DF7VX, reported on the change resulting from the dissolution of the "Referat for future technologies" whose activities have now been assigned to the "VHF/UHF/SHF-Referat. The aim of this change is to enhance the dissemination of technical know-how beyond the limited extent possible through the "CQ-DL". Consideration is being given to the establishment of a technical forum. Hellmuth made stressed, that this would only be possible if more radio amateurs were prepared to support the Referat in the future. Regarding personnel changes Hellmuth informed that a successor is needed for Alfred Schlendermann, DL9GS, to serve as expert to the Referat "radio competition". Alfred for many years the leader of this Referat would now like to put this work into younger hands. There exists already an idea to attach this sphere of activity to the Department for "VHF/UHF/SHF technology".

In the following lecture Michael, DB6NT, departing from his usual routine of reporting, on new technologies for the GHz-bands spoke about the changes in the frequency allocations in the bands above 24 GHz as a consequence of the recent IARU conference. In particular, he drew attention to the withdrawal of the 145 GHz band from the amateur service. However, to make up for this loss a new allocation has been made at 122 GHz. In addition, there are changes in the status of primary and secondary users in the bands at 76 GHz and 134 GHz. On the positive side amateur radio will again be permitted in the bands above 300 GHz. The uncertain status of these frequencies had caused much confusion in the past year.

The "technical part" of the conference began with the lecture by Juergen Dahms, DC0DA, who supplemented his presentation in the previous year's conference of a 24 GHz transverter ("Rocky 24") with a paper on the structure of a waveguide version, also employing modern modules. The inclusion of a "reversible amplifier" (in one position it functions as the receiver pre-amplifier and by simply turning it physically through 180 degrees it can serve as the transmitter power amplifier) probably offers the cheapest solution for a 24 GHz station - with further improved receiver noise figure and power output. This station was field tested during the winter BBT by DL4SBK who managed a QSO with DJ5AP over 161 km in his first attempt.

Juergen then reported on the new microwave band allocation at 122 GHz. The lecture's aim was to provide the keen microwave experimenter with a simple concept for the use of tried and tested modules in the realization of a transceiver project for that band at minimum cost.

Michael, DB6NT, produced two new teflon boards (receiving mixers and transmitter multipliers) to complete the project. In the absence of a partner station to conduct tests Juergen offered the assembled system to Karl, DJ6BU, who during his initial attempts was able to receive a beacon signal over a distance of approximately one kilometre at approximately 45 dB above the noise. He will next try to cover a distance of 1.5 km under special consideration of different humidity levels. Delegates applauded Juergen for his latest pioneering effort in developing a microwave station for the new band.

The course of lectures was continued by Dr. Dirk Fischer, DK2FD, who reported on broadband feeds as exciters for parabolic dishes for the frequency range 2-8 GHz. In contrast to multi-band feeds with three or four resonances in the amateur radio bands, broadband feeds can cover up to three octaves. Dirk described the necessary steps to realize such a feed. Unlike the old days one does not start with a drawing board and a drill press. Nowadays, the first step is a 3D simulation on the computer! Dirk presented three different types of feeds whose upper frequency limit was 8 GHz. Dirk also explained his newly developed 2.3 GHz one-board transverter and on the basis of a first sample discussed the critical points which are to be considered in the construction. He only briefly touched upon the topic of "SHF Power Amplifier" and revealed that he will market a special series of "Low-Cost-PA's" for the 23cm and 13cm-Band beginning in March/April of this year. The power outputs for the different models range between 1 and 200 watts. Details can be found on his homepage.

In the subsequent "theoretical" lecture Roland Neumann, DL8DAV, confronted the topic "Circle/Smith Diagram" without which no serious GHz amateur can successfully undertake the development of circuits for the microwave bands. The lecture's aim was to encourage delegates to acquaint themselves with the properties of the Smith-Diagram. Getting to grips with the necessary mathematics, however, can be a somewhat 'tormenting' prerequisite. Roland made a "trip" into the realm of the complex numbers and the "Gausssche Zahlenebene" (Gaussian numbers) before he demonstrated the advantage of using a Smith-Diagram for the computation of simple HF circuits. Naturally, he could not address in the limited time available the use of the diagram for the dimensioning of complex circuits for the microwave frequencies. However, he promised to do so in another lecture at next year's GHz conference.

After lunch, which as always offered the opportunity for the deepening of personal contacts, the award of the "Contest Cups" took place. Alfred Schlenderman, DL9GS, the leader of the

department “radio competition” honoured the winners in the three competition categories. In the category “one-man station”, the cup went to Hans Harazim, DK2MN, for the ninth year (in succession). Informed „insiders” claimed to have heard that Hans is planning a victory yet again in the coming year wanting to occupy his usual place on the podium for the tenth time. Also, second and third-placed (Norbert, DL1SUN and Uwe, DL1SUZ) - in the GHz scene already known as "the GHz-twins from Mecklenburg-Western Pomerania" – were present to claim their cups. In the category “crew stations”, the "series winners" DLOGTH attended with several representatives in order to receive the cup now for the seventh time in succession. The district leader of Thuringia, DL2AVK, surprised the Contest group with a greeting address read out by DL4BBU and a bank cheque as a small contribution to operational expenditures which are borne otherwise solely by the group. Representatives of the second (DL0TUD) and third-placed (DK0OG) were present for the receipt of their cups. In the category “OV-groups” the OV Bergkamen won by a wide margin. This OV's exemplary efforts to interest young radio amateurs in the microwave bands owes their success in winning the Contest Cup with consummate ease not least to these newcomers' activity. The representatives of the OV's which occupied second (OV Goch) and third place (OV Bielefeld) attended in person to receive their cups. A cordial applause acknowledged not only the achievement of the winners but also honoured Alfred for the time-consuming evaluation of annual VHF -, UHF- and microwave competitions and his presentation of the participation statistics for the contests in the past competition year.

In the final technical lecture of the day, Ewald Goebel, DK2DB, who had kindly agreed to contribute a paper reported on the construction of power output stages for the 2 m, 70 cm, 23 cm and 13 cm bands using modern components. Radio amateurs began replacing the good old vacuum tube in the output stage with power transistors several years ago. However, in the past transmitter power was limited by the high price of these devices. That has changed and it is now quite possible to achieve outputs in the range of 300 watts on 2 m and 70 cm, at least 200 watts on 23 cm and the maximum permitted 75 watts on 13 cm at 'amateur-friendly' prices.

A technically sound concept is, as always, a prerequisite for the construction of such amplifiers. Ewald has compiled fundamental considerations into a product requirement specification. He attaches particular importance to the reliability of the output stages by efficient removal of waste heat (at the 300 watt output level some 350-400 watts of waste heat have to be “destroyed”) through careful layout of the amplifier housing and the arrangement of the cooling air exhausts. He also replaced the transformer in the current supply by weight saving DC-DC converters. For the 23 cm and 13 cm band - RF modules by “Kuhne-Electronic” are used. The modules for 2m and 70 cm are his own designs. The design weight limit of 10 kg was adhered to without problems (approx. 8, 5 to 9.5 kg, depending upon type of PA).

The last speaker was Manfred Lugert, PA3GLB/DL5FAB who presented a paper on the operational aspects of "EME of the Astropeiler Stockert – 10 GHz Amateur Radio Activity of the Support Association Stockert e. V.". First Manfred spoke about the history of the 25 m dish on the “Stockert” in the Eifel Mountains which will celebrate its 50th anniversary in 2006. Unfortunately, only after commissioning the dish was it realized that its originally planned use for radio-astronomical research was not possible due to its exposed location and the resulting susceptibility to interference from surrounding radio sources. The dish was then used for military research and the monitoring of the air space to West Berlin. In 1967 a 10-meter dish was erected nearby. This antenna is a highly accurate aluminium construction and was used for measurements of the sun at frequencies of 17 and 34 GHz. The support association Stockert e. V. (group around DL0EF) took over this dish after regular use of the installation was discontinued at the beginning of the nineties. With great care and considerable effort the members of the support association converted this dish and the associated microwave modules for amateur radio use – especially for EME on 10 GHz. Manfred described the conversion work and the technical parameters of the current facility in

detail. As a highlight, he played some recordings of EME signals whose signal strength astonished and inspired all GHz freaks present. The group of GHz amateurs around DL0EF has been participating in the annually taking place EME-contests since 2001 and could achieve, from the beginning, very good results. Anyone wishing to know still more about the Astropeiler and the support association may visit the homepage of the Astropeiler.

The conclusion forum did not have the traditional character of a "question and answer session" due to the principle discussion in the morning. To the satisfaction of all present DL4BBU noted that this discussion – admittedly initiated somewhat provocatively by the organizers - had obviously borne first fruits. During the course of the conference already six commitments had been obtained from OMs to present papers at next year's GHz conference. Spontaneously Ralf Benninghoff, DG6EA, undertook to develop the overdue homepage for the conference. It will aid documenting the status of the preparations for the conference through the year and in winning new participants.

As always, all lectures are summarized in the conference proceedings which is available at the cost price of 5,- € plus postage of 3,- € Please order directly from DJ6XV or DL4BBU. Also back issues of previous years' proceedings are still available.

Heinrich Frerichs, DC6CF, participant in all 28 GHz conferences (!), has produced videos of the conference again this year. Prospective customers should contact him please directly: Heinrich Frerichs, DC6CF, Süderstr. 12, D-26835 Holtland.

Finally, the "two Peters" (DJ6XV and DL4BBU) who organised the conference thanked all for their participation and all conference speakers for their contributions. Special thanks still went at Professor Dr. Wolf-Henning Rech, DF9IC, who could not hold a lecture due to his other professional commitments. However he submitted at very short notice two contributions for the conference proceedings that assisted greatly in producing a presentable scriptum.

Good-bye to till the 29. GHz-conference next year!

Peter Hoerig, DL4BBU; dl4bbu@darc.de