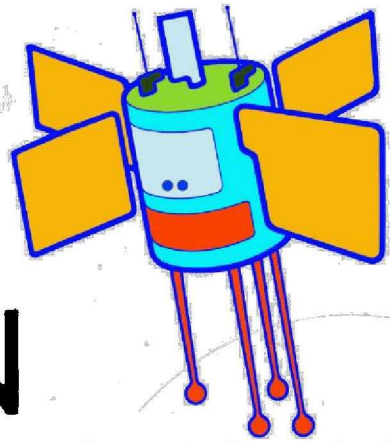
December 2014
41e jaargang nr. 4



DE KUNSTMAAN

In dit nummer o.a.:
"DVB-S2 VCM
Weersatellieten in Vietnam deel 14
10 MHz GPS referentie
en nog veel meer……

ISSN: 1382-8215

Dear member,

This pdf contains some translated articles of our Dutch magazine “De Kunstmaan”.
Google Translate is used; none or very few corrections are done afterwards. Results may be sometimes incorrect or hard to understand, but mostly I think it is usable.
Figures and pictures are partly left out. Please use the “paper” (Dutch) magazine together with these translations.

I hope these translations will help you to understand the Dutch articles.

Please check also our web-site, which has now a translated version:
www.kunstmanen.net
(middle of home page, “English version”).

Rob Alblas
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Content

From the CEO

Before you is the last Kunstmaan this year. As announced in the last meeting, this is the last in the A5. From next year we release the Kunstmaan A4. The amount of paper remains the same, the number of pages is smaller but w e expect that readability is better. In particular, schemes that are to be printed on A4 much better leesbaa r. At the last meeting we have some specimens let go around asking what font is in favour, this has become 11 point Arial.

Such improvement is not for nothing. It seems that the printing costs remain the same (because the amount of paper remains the same). We have l w e need a larger envelope, so we still puzzling as we not come into a higher tier of Aunt Pos. The preparation is more time-consuming because the format is in columns. From this place one thanks to Harry, our editor, who liked the new layout wants to work.

The last meeting had a nice turnout. Very nice was the presentation by Wim about the receipt of the Rosetta spacecraft 500 million miles away. A small dish of 150 cm should already be sufficient. Do not expect that you can receive a plaque, in the best case you zi et hatching a signal above the noise.

The signals are 8 GHz is much higher than we are used to. A mesh dish build itself is no longer possible if we are within 1 / 10th wavelength (4 mm) to be accurate. The imager and the underlying LNA with down converter (front-end) are also a specialty.

So by the end of the year it is time for some considerations. The direct reception of the Fengyun shows still more difficult than expected. Maybe we should go to a larger dish. You can read more about the adjustment of a parabolic dish of Peter & Peter in this Kunstmaan. This year for the first time direct LRIT - receipt of the MSG-3, w ell with GnuRadio and a 160 cm dish.

The Russian Meteor seemed to be a welcome addition to the American and European weather satellites. However, the quality of the satellites seems a little less. Meteor M1 sends no HRPT recordings and the recently launched M2 sends in HRPT only a gray stairs. With this latest satellite seems to be a revival of the 137 MHz band come. With cheap to make RTL SDR dongles you seem LR P T recordings many times more detailed than the APT recordings of NOAA's.

With the advent of inexpensive software receivers the need for a satellite dish antenna control with shows still present. By increased interference and filtering become much more important. This inexpensive receivers have virtually no filtering or amplification in itself.

Another development is the rise of the PC. Twenty years ago, we had to develop our own image writing equipment because there was no alternative. The advent of the PC brought many possibilities for signal processing. Expected to PC be responsible for an

increasing share of th e receiver chain. The need for a good front-end remains unchanged!

In this issue, two articles of my hand that are passed from the previous track. One article is about the GPS reference. Last meeting I brought it d project and Timo has performed there on measurements. It's fantastic to be able to self-build such super accurate equipment to make!

Figure 1 Phase Measurement between GPS and Rubidium oscillator

The second article is about my HRPT installation. A small addition to this article, I have now built a colander to the imagesetter T problems with the strong interference signals have been unfortunately.. Go the next time I started with the lighting technician. First, a pre-amplifier with other less amplification followed by the filtering. Hopefully this fixes the problem.

Finally, I want everyone on behalf of the entire board, wish happy holidays. K I hope to meet you all at our meeting on January 10 followed by New Year's reception.

With regards,

Ben Schellekens

PS: We remind you to pay your dues for 201 5. We keep the membership fee of 25 euros per years for members in the Netherlands and 30 euros for members abroad. An important part of the contribution is paid to the spread of Kunstmaan.

De Meteor M1 zendt geen HRPT-opnames uit en de recent gelanceerde M2 zendt in HRPT alleen nog een grijstrap uit.

Report meeting November 8, 2014.

1. Opening
On July 2, 2015 GEO is organizing a tour at EUMETSAT in Darmstadt. More information (including registration) on this tour will be provided in due course.

Meteor N2 sends LRPT on 137 MHz from; this is to be received with a cheap SDR dongle. There is a lot of PC power needed to process the received data to a plate.

SAW filters for the group hit receiver, but there are alternatives.
HRPT decoder boards are still enough.

News about our magazine "The Kunstmaan" We're going for the next year on to the A4. With the current A5-format, it is difficult to record a clear schedule; for this is the size too small. There are two specimens taken: glossy and plain, in which a number of letter formats are. Is requested to the members to indicate which variant they prefer.

Scanning of articles can be done by the librarian Paul.

Ben is going to order parts from Mouser; one can give a wish list. This will be done next weekend (unfortunately too late if you're reading this).

2. Report September 13, it was published in the October Kunstmaan.
There are no remarks on the report.

3. Adoption of agenda
No additions.

4. Administration
We are looking for a new webmaster, Joop terminated its membership. Interested parties can contact one of the board members.

5. Satellite Status (Arne)
See later in this KM.
Russian METEOR now LRPT send, receive at 137 MHz, with a "cream whipper". This is not APT! There are many variants HRPT-; unfortunately, Russians, Chinese, Europeans and Americans all have their own "standard" in the 1700 MHz band.

6. Any other business
Timo: When is the next meeting? January 10th.

Robert Langenhuizen: pa0ryl@amsat.org A seminar RF vector network analyzer, on 13 December in Bosch en Duin. Registration is required.

Koos Kramer:
Can the WRX receiver used for LRPT?
A small part could be used, but there must be another demodulator. LRPT is digital; FM demodulator that is now in the WRX is unusable. SDR with a separate preamp is the simplest solution.

Paul Baak: Will there be problems if you are near 137 MHz with a radio amateur receives at 144 MHz?

If well protected should be no problem.

Timo: Baco in IJmuiden machined housings, which you can use as a shield for a dongle, to prevent unwanted frequencies radiate.

Paul about the library: The last sheets are displayed on the reading table, even the ARRL Handbook 2015 is now in our possession.

He also wonders whether the FUNcube project is something for group members.

It is further reported that the landing of Philae on the Rosetta 67P / Churyumov-Gerasimenko is to follow on TV and the Internet.

Elmar: From the estate of Jo are some things available, including hardware, such as a rotor.

Ben Clevers stops workgroup hobby; he will in due course what set things available, including a receiver.

Ben Schellekens has displayed some hardware, including a 10 MHz generator, frequency held on using GPS.

Timo: has a rubidium standard, which the generator Ben soon will be compared.

Peter Smits experiments with Peter Cooper with the number of turns of a helical. Less windings (6 or 4) in place of commonly used 8 turns can produce better results. The opening angle becomes smaller with more windings.

7. Closure

The next meeting is on January 10, followed by the New Year's reception.

Lecture by Wim Bravenboer: FUNcube and reception of 8 GHz
The target group of the project is FUNcube school students, to give them more affinity with this technology. The FUNcube works in the 145 MHz band; there are different frequencies for up- and downlink, and for telemetry. This can be received with a FUNcube dongle, with the aid of a Yagi antenna, may be set by hand.
There is software that telemetry data can be decoded and can be made visible.
There are now 3 FUNcube satellites operate; number 4 is in development.
For more information see the website: funcube.org.uk

With the FUNcube is longer possible; in combination with a cross is also to receive the 8 GHz band. There is someone who claims that he thus received the signal from Rosetta, with a 1.5-meter dish. This is a modified 10-12 GHz LNB; only the amplifier part is used. Behind them are a band-pass filter and applied mixing stage. Was it Rosetta? Anyway beat frequency and direction from which came the signal. Decoding was not possible.

Wim of the above person acquired the stuff, and this is then itself to get started.

Rob Alblas
(Secretary AI)

Weather satellites in Vietnam (1 4) **Fred van den Bosch**

PicoScope 2204A

In the last issue I was thumbs or PC-scope would arrive here. Well, the thumbs helped: PC scope was neatly delivered at an early stage announced time. Total duration from England: 1 week accurate:. 3 days from England to Ho Chi Minh city and 4 days from HCM to Nha Trang Setback was that there had to be VND 359,000 to import (about 9000 km). (450 km.). paid. Anyway, still cheaper than food in the Netherlands: no VAT. Nothing but praise for the service of Pico Technology. Not only was there very quickly responded to my emails, gave it to that cheap shipping way for me was well suited. And that was true. See http://www.picotech.com/ for an overview of the models. There is also documentation and download a demo version of the software.

I am very satisfied: it is a cheap alternative to my fallen scoop. The disadvantage is that the HD from the laptop, which I had prepared as a monitor for the scoop, has given up the ghost for the 2 nd time. There was already a by a shop in Nha Trang mounted second in HD. Which has so long endured. For now, I my old netboekje but prepared.

Satellite

I had already looked at a while ago to mesh dishes in Ho Chi Minh City. I h ebb when words and in writing one can find matter who sold them, and doubtless therefore counted firm prices. During a short stay in Bangkok about a year or two ago I saw enough mesh antennas. But googling yielded only dishes NASA-like proportions on.

But still build. Unfortunately I find, despite extensive inquiries and found no case in Nha Trang and surrounding areas, which sells aluminum. So I take the material but at my next visit with the Netherlands. It weighs fortunately not much and the parts of a 1.20 m.-dish should fit easily into the trunk Gauze is no problem. that they have here in a lot of shapes and sizes.

I have now been fixed but when visiting Nha Tra ng brought a popnageltang: pneumatic. This is because they were not ordinary, and also because it takes only 2/5 of that at Buitelaar in Moordrecht. Maybe I now must go but what more riveting.

Everything

Space and astronomy

Overview of everything on the moon is lagging.
http://history.nasa.gov
/FINAL%20Catalogue%20of%20Manmade%20Material%20on%20the%20Moon.pdf

ESA

An interesting story about ESA Noordwijk
http://computerworld.nl/big-data/84265-techrepo--esa-satellietfabriek-verscholen-in-hollandse-duinen

EUMETCast switches to DVB-S2 VCM

What is EUMETCast:

EUMETCast is the retransmission of Meteosat and other satellite images via a "satellite TV" on 11 GHz. This service is used since 2003. Even amateurs can receive these images after a single purchase Tellicast software with USB dongle (the EKU).

In the early years were broadcast only images of Meteosat 8 but there is more and more data is added geostationary weather satellites around the world, including images from polar orbiting satellites such as NOAA, MetOp and MODIS.

Why to DVB-S2 VCM:

DVB-S standard used now allows only 30 Mbps "IP data rate" to 25 Mbps at present there is little spare more.

To further increase the amount of data sent over EUMETCast allow in the future we have chosen a new transponder broadcast "DVB-S2 with VCM" mode.

Since June 2014 has been tested and since August 14, 2014, this new transponder operational.

This new transponder is on Eutelsat 10A, 11263 MHz Horizontal and stands at 10 degrees East while the old transponder 9 eastern state.

The new transponder transmitting two services from, Basic Service (a continuation of what we received) and High Volume Service, a new still to fill data stream.

The Basic Service uses 8PSK 3/5 modulation and can grow up to 50 Mbps "IP data rate" and can be received with existing satellite dishes of 85 cm (this size is recommended since the beginning by EUMETSAT).

The High Volume Service uses 16APSK 2/3 modulation and can grow up to 77 Mbps "IP data rate", for good reception is a dish of at least 120 cm needed.

The HVS service broadcasting now only empty test files, it is expected that HVS will only really be used as data from the mid 2015 Sentinel3 Polar satellite is available.

Picture: FutureEvolutionofDataRates.png

What are the benefits of DVB-S2 VCM:

With VCM EUMETSAT can meet the needs of professional users (who always demand more data) and the amateur user who does not have permission or space for a large satellite dish.

Because BS and HVS are broadcast on the same transponder with equal "symbol rate" of 33 Msym / s you have only one antenna and one receiver required. Same receiver so the BS data or the HVS data or both simultaneously received.

The new uplink station uses automatic power control (ALC). During a rain shower, the uplink power above the uplink site increases so that the signal strength at the user remains the same. And in bad weather or emergencies Eumetsat can quickly switch to a remote backup uplink site.

The user will only lose a few packets.

The old uplink Usingen this did not result we see signal attenuation or even failure if there is bad weather over Usingen.

The new transponder covers a larger area and is to receive far beyond Europe.

This configuration is expected to Eumetsat to mid-2023 meet all expectations.

What are the disadvantages of DVB-S2 VCM:

Unfortunately, existing DVB-S and 'DVB-S2 without VCM "recipients after December 31, 2014 are no longer useful because it stops the parallel broadcast at 9 degrees East.

Where the old transponder QPSK (4PSK) used is now used 8PSK or 16APSK. This allows you to send more data, but the bandwidth is also larger. And because the transponder in a satellite, but a limited ability may use this means that the signal from the new transponder is weaker than the old one, and is weaker than neighboring transponders. By using more Forward Error Correction (FEC 3/5 instead of 3/4) this is somewhat corrected. But without proper preparation is the alignment of the dish so difficult.

BS reception at "professional" users expect EUMETSAT with a 90cm dish an availability of at least 99.98%. or higher. Thus receiving BS can at best (100-99.98) / 100 * 24 hours * 365 days = 1.8 hours per year loss by local showers. Unfortunately, EUMETSAT has no "rain fade availability" data for dishes smaller than 90 cm available.

Basic and High Volume Service alternate quickly, this a different receiver is needed that can handle DVB-S2 with VCM (Variable Coding and Modulation). If you see offered a receiver with DVB-S2, but without mention of VCM then this almost certainly unsuitable.

In tests with weak signals has shown that all VCM compatible receivers (even professional)
still have a problem with weak signal. If the receiver next to BS also weaker HVS attempts to receive a small dish or during heavy rainstorms then goes unexpectedly also BS data lost.
In order to explain from this you should know that the signal to noise ratio (SNR) is decisive for a good reception. For BS is a minimum of 5.9 dB of SNR is required, for this HVS is 9.3 dB. For even in bad weather yet to receive advises EUMETSAT a margin of at least 4 dB above these values.
During practical tests it has been found that, when all of HVS packet loss occurs under 9.9 dB at all recipients. In contrast, BS reception is error-free at 5.9 dB and you see only packet loss 5.8 dB at the receiver SR1.

Now gives a 85 cm dish in good weather about 11 dB SNR and can except BS HVS also be just demodulated.
But during a rainstorm, the signal drops to a 85 cm rapidly to 9 to 10 dB. Although this is still more than sufficient for BS go there anyway unexpectedly lost packets and files. This is probably because the demodulator is far too busy to demodulate the noise engined HVS and hereby gives no priority to receiving BS!
In the SR1 receiver you can adjust the "link margin threshold" so HVS stops before it adversely affects BS. You can also turn off at this receiver HVS.
TBS receivers have this threshold setting yet. And until recently could not turn your software in the TBS HVS. My tests with the TBS 6983 and 5925 showed therefore much packet loss BS SNR values between 9.3 and 9.8 dB. Among the 9.3 dB switch all receivers HVS automatically and you can BS again well received as long as the signal remains above the 5.9 dB SNR.
TBS has recently improved software so you can switch from HVS whole. Then there is no distortion on BS more. With a larger dish (110 cm or more) of these problems occur only during heavy rainfall.
Image: Calling for the Basic Service 0.9 m.png

What remains the same:

If your dish, LNB and cable 100% in order, then you can continue to use it. But the new transponder is through the increased bandwidth and much weaker than the old signal. So it's all a bit "tighter" and you will be the dish and LNB must closely align again and adjust it to 10 degrees east!
Outdated or leaking LNBs and bad coaxial cable will now fall by the wayside and need to be replaced.
On the old transponder was spare signal which we with less than the recommended 85 cm could receive fine. Testing to prove or small plates are still usable. I expect no problems with 70 or 80 cm (measuring the width and not always aware of an offset dish) but may be 60 cm dishes only to be good usable again.
The TelliCast software and USB dongle (EKU) and your license the same and keep the transmitted data on BS is currently equal, so your current PC and decoding programs continue to work.
The new receivers are not asking more processing power of your PC.
Even with XP, you can receive as long as you can find the right drivers yet.
For mid-2015, an improved version TelliCast spread because the current TelliCast version (2.4.4a) the large amount of expected data of HVS can not well.
This update will be free of charge. Keep in mind that the extra data of HVS much capacity (storage and processing) will ask the PC. Possible that an older PC these data can not in conjunction with Basic Service.

Suitable receivers:

Since March, we have been searching for suitable and affordable receivers. This is not easy because VCM is not yet widely used by TV satellites.
Since June I test a number of recipients, hereby I look not only or 'he does it "but also what happened in bad weather. I also test for conflicts with Windows and that's all it is stable and not after one day all stops with a bluescreen!

Ayecka SR1 (self-test)

- Professional receiver but a second network connection is required. One network interface is 1 Gbit / s and is used to receive data, the other is 100 Mbit / s and is used to set and control the receiver.
- The receiver runs stably and reliably, but some network knowledge is required when setting up. The receiver has set up a second antenna input and you can many parameters, but this is all through text menus via Telnet or Putty.
- With one receiver and a switch can provide multiple PCs data. But it is not recommended to convert the received data on your home network because the network (especially wireless) continuous data stream can not handle well.
- GEO shop now has a Christmas offer (£ 360 for GEO members) whereby unnecessary options as second input are disabled.

Novra S300E (tested by EUMETSAT)
Professional receiver, but also a second network connection is required. Slightly less extensive than the SR1 and the network goes up to 100 Mbit / s (BS and HVS can work above 100 Mbps in the future).
TBS 6925 (V10 self tested)
PCIe expansion card recipient. Older versions (V10) quickly broken by overheating. V23 version works well but do use the latest software from the TBS website and not from the supplied CD-ROM. This type is probably soon no longer manufactured and has been replaced by the TBS 6983. You see the price already lowered to ca.166 Euros. The PC must have a free PCIe 1x mortise lock.
But several users indicate that this receiver 1 to 2 dB more signal (larger dish so) needs.
TBS 6983 (V13 self tested)
PCIe expansion card receiver with dual tuners and dual demodulator. This is new and difficult to obtain, works well but do use the latest software from the TBS website and not from the supplied CD-ROM.
During my test showed this receiver at 0.1 dB after just as sensitive as the SR1.
The PC must have a free PCIe 1x mortise lock and a free "molex" (white, 4 pin) power connector.
Prices round $ 249 or 229 euros in Germany.
TBS 5925 (self-test)
This external USB receiver is promising, small and easy to connect with USB. However, the box can be quite hot (depending on electricity used by LNB) and also after testing six new driver versions, after months of no stable driver. When I crashed Windows 7x64 sometimes within a day, sometimes after 14 days, but David Taylor on Windows 8 within 30 minutes! Possible that the 32-bit drivers are better but I have not tested it.
A test with an alternate driver CrazyCat solves the crashes but this driver switches HVS sometimes not, and under 9.5 dB SNR lost the demodulator so much BS packets.
It is by TBS worked on the driver issue but at present this receiver is only suitable for BS or only usable with a larger dish (100cm or more).
Prices range from 200 to 219 Euros.

TBS 5980 (self-test)
Very unexpectedly came CrazyCat on MSG-1 yahoo group in mid-November with the message that this receiver with its proprietary driver could receive the basic service, while external USB receiver is not compatible VCM!
The demodulator used (must be type STV0903bac) can be set so that it only pulls the BS data from it. The HVS data does give equally disturbed but once BS starts the demodulator takes this just in time again. The drivers of TBS this otherwise fails, you must use the special CrazyBDA 1.0.0.2 driver.
Also with other software, this receiver will never receive HVS but the price is also to (about 85 Euro in Germany). Because the online shops do not report what demodulator occupants there remains a risk buying. Because if the manufacturer goes to a different chip than is debatable whether this alternative driver still works.
Scan to download after the driver first well for viruses because he comes from the Ukraine.
Unfortunately, the driver is not digitally signed and you should put 64 bit version of windows in test mode in order to use the driver. CrazyCat one is a highly regarded specialist in the satellite TV world and I must say that the first test results are excellent and equaling that of the SR1, albeit only on Basic Service.
SkyStar 2 eXpress HD PCIe (tested by Ernst, available from 40 Euro) and **SkyStar USB HD box** (tested by EUMETSAT)
These receivers are not compatible VCM but have STV0903bac demodulator **only** with special drivers Basic Service can receive. Drivers for these recipients CrazyCat at this time, however, **only** available for GNU / Linux (yet) for windows!
What is required for migration from DVB-S to DVB-S2:
1 Disconnect Old receiver:
Make sure the old receiver (internal or external) no signal gets more.
You do not have to remove it or uninstall.
2 Connecting and Configuring your new receiver:
This is entirely dependent on the brand and type, see the list of suitable recipients.
EUMETSAT has for most recipients written a manual check
http://www.eumetsat.int/website/home/TechnicalBulletins/EUMETCast/DAT_2082113.html
and browse to the recipient list, here are the recipient "configuration guides"
The new receiver can receive the old transponder, it is advisable to try this first.
Only when everything works well on the old transponder, switch to the new.

3 Adjust recv.ini file and restart TelliCast.
Search the recv.ini file (usually C: \ Program Files \ T-Systems \ Business TV-IP) and change the line *interface_address = 192 168 238 238* (or similar) in *interface_address = 0.0.0.0*
This Tellicast will start with all existing network adapters scour EUMETCast traffic and choose the right ones. (Which is why you must first disconnect the old receiver of the antenna)
5 Verify that you are indeed receiving the new or the old transponder
If the T in the taskbar will open the HTML purple shell and go to *Statistics page,* here *Server address 10.90.43.51* in the new service. If you *10.10.10.103* see you get the old transponder.
6 twist dish 1 degree to the east:
1 degree is just a little bit, in a dish with a width of 80 cm, the eastern edge but must be turned back to 7 mm. In a 100 cm is 9 mm, and at a 120 cm dish, this is 10.4 mm.
7, the dish on the basis of received signal to noise ratio (SNR) carefully optimize.
When you receive the new transponder you must readjust the dish alignment for best SNR value.
How SNR receiver reads vary but most can now beside "Signal Quality" also display SNR.
SNR values are comparable to other receivers or systems, so you can check by comparing with others or your dish, LNBs, coax and receiver perform well.
See http://www.satsignal.eu/mrtg/performance_eumetcast-europe_snr.php
In particular, the optimization of the distortion and focus LNB can have a high gain signal!
You must place a new dish, go to www.dishpointer.com and use of buildings or other objects in the distance as a reference point to align roughly.
Beware that you are not too far runs eastward because at 13 degrees East is a station on 11258 MHz! Automatic Frequency Compensation (AFC), the receiver will pull to 11258 instead of 11263 MHz. In the SR1 you see a wrong mode 8PSK 3/4 and 27,500 Msym / s are displayed EUMETCast used 8PSK 3/5 and 33,000 Msym / s.
8 What if the SNR value is less than expected:
If you see poor SNR values (compared with others who have the same size dish) make sure you have a clear view towards 10 degrees East. Trees or shrubs dampen the signal, especially if they are wet.
If the LNB from an older model that I recommend to replace it for a Inverto Black Ultra, this came to a comprehensive test me as best coach and is quite affordable. Although the manufacturer a noise figure (Noise Figure) of 0.2 dB specify defeated this LNB many LNBs sold as 0.1 dB NF!
I have tested the models with Twin and Quad connections but expects that the implementation of some connection works just as well. My 5 year old Smart Titanium LNB replaced by this Black Ultra was my SNR of 0.5 dB up.
Also check if the dish is not deformed and that the rod of the LNB as is tight and perpendicular to the platter surface.
What can you do to reduce dropouts in rain:
11 GHz signals are sensitive to rain. The increasingly frequent "tropical rains" we can not change. But users report that after a rainstorm the SNR does not rise because rain drops remain on the LNB cover. Because through this small surface enters the signal you must ensure that the LNB cap remains clean and water resistant. To keep the waterproof hood you brush gently with car wax. But do not use polish or abrasive products as they make the plastic dull and rough.
I am now experimenting with pure carnauba wax to the LNB hood, the question is how long this will work before you need to lubricate it again. Others use an empty soda bottle on the LNB hood with good results!
Moreover, moisture on the dish surface no adverse effect, do not polish it because it reflects all the rays to the LNB hood which can melt in March or October!
HVS received or not:
If you receive HVS Basic service but just not succeed, please read the following before you are considering placing a larger dish.

- HVS is now running in test in order to receive the empty dummy files, you must submit an application to ops@eumetsat.int you'll get 3 files of 48 MB each per minute within (216 GB per day!)
- For HVS you need a second Tellicast cli ë nt install on the same PC, then use this same EKU.
- Only after mid-2015 (as Sentinel3 is successful in business) will come on HVS data. However, there is little or no information on file formats used email and software required to viewing as these images.

Look at http://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Sentinel-3 and keep the

EUMETSAT website regularly.
Photo: Mini PC with SR1.jpg
Shown is a mini PC Shuttle DS81D with i5-4570S Haswell @ 2.90GHz + 8 GB of memory.
Very compact but unfortunately used expensive laptop memory and 2.5 "hard disk.
Must be tough enough for receiving and decoding of future HVS and the PC has been two standard network connections, ideal for the SR1 receiver.
Photo: Dish 122cm.jpg
In this picture you see my old Echostar 122 cm dish with Inverto Black Ultra Twin LNB.
Delivers with good weather about 14 dB SNR and is therefore suitable for HVS reception even in bad weather.
The LNB has been replaced by a Inverto Black Ultra Quad LNB so I can compare three recipients.
Photo: Signal verzwakking.jpg
To test the receivers with weak signal I mounted a gear motor on the front screw.
So I can lift the dish foot a few inches and have so an adjustable attenuation.

References:

Eumetsat page with all the information on the transponder change:
http://www.eumetsat.int/website/home/TechnicalBulletins/EUMETCast/DAT_2082113.html
David Taylor website is full of information and practical tips:
http://www.satsignal.eu/wxsat/Ayecka/
http://www.satsignal.eu/wxsat/atovs/hints+tips.html
Official SR1 manual:
http://www.ayecka.com/downloads/SR1%20-User%20Manual.pdf
The presentations held during the successful EUMETCast User Forum can be found at:
http://www.eumetsat.int/website/home/TechnicalBulletins/EUMETCast/DAT_2266023.html
On the English MSG-1 Yahoo group is a lot of experience and you can ask questions:
http://groups.yahoo.com/neo/groups/MSG-1

Report Meteosat-7 reception
At last the time has come, it's Wednesday, July 2nd, 2014, everything is ready to Meteosat 7 to listen.
The parabola is mounted on a temporary elevation axis and according to the program "x-track" toward the southeast with an elevation of about 18° (Meteosat 7 wobbles quite).
The LNC-1700 put on channel 2 (I call this channel 2 because the crystal thereof 97.0937 Opens at 137.500 MHz in our receiver). My LNC-1700 I have been in the same housing as the WRX-1700 print accommodated. So I always go to the antenna (parabola) with a signal of about 1700 MHz to the receiver.

In the days before that, Timo my Helical, (which I antenna line according to the W1GHZ book 8 turns brought to 6 turns), with stretching already on frequency brought sequence and put the nylon set-screw 50 Ω. On the base plate of the Helical I mounted a preamp Mini Circuits (type ZX60-242GLN) and this with SMA connector merging into an N-connector to the outside.
First I had the N connector, which I'm going to the receiver, the cable directly from preamplifier soldered. DO NOT DO IT !! According to the measurements of Timo this gives disastrous damping. So I changed again and the cable neatly to BEI the sides equipped with SMA connectors and ringing on an N connector.
Now the time has come: ABSOLUTELY NOTHING, just noise.
I had no broadcasting schedule of Meteosat available, I am every 10 minutes listen. And, sure enough, at about 13:20 pm I heard the familiar click or clock tone of an APT signal. Soon the parabola better aligned and, yes, a dike of a signal. Unfortunately, I can not give a signal at this time, because I was so excited that I completely forgot to record it. What I do not know, that's the was not a completely clean (noise-free) signal.
The reception did not take long: ± 8 minutes. Thereafter, the APT-signal turns into a beep, and then disappear.
That whole Wednesday afternoon, I also used to ex- with the signal from Meteosat experiments tars.
Here some of my findings.

- Does the helical about the middle of its length at the focal point of the parabola then the signal strength decreases (from the front of the helical)
- The 50Ω adjustment (adjusting screw) of the Helical also turns out to be not very critical.
- Around the base of the Helical I have a 3 cm with aluminum foil. High created edge. The effect of this is that I could not see that the gain increase but took the directional effect was much greater (target angle less)
- The film I have at a later stage again removed because it did not contribute to more reinforcement.
- Meteosat also receive without preamplifier. If you know where you need to listen then the APT signal just to hear above the noise.

Details of my parabola:

- Average 1:19 mtr.
- F = 50
- F / D = 0.42.

Data from my Helical as shown opposite:

- 6 windings
- Diameter: 60 mm.
- Emergency: ± 13 mm.
- Total length: ± 82 mm.
- Base plate: 130 mm.
- Wire without insulation thickness: 2.8 mm

(do not remove wire insulation).

sequel

On Wednesday, September 17th, a beautiful day and a clear sky, have Peter Smits and your author, held a parabola measurement day.

The purpose of this measurement day: how many Helical windings are the need to have to the best results reached by our parabolas? (If the source was again Meteosat 7).

Measurement setup.

The signal was measured by the S-meter of the WRX-1700 from me and as reference tion was used my dish with Helical 6 turns. Of these, the S-meter was rash 80 - 81. The first measurements were made in the morning at 11.00 with the dish of Peter S. and Helical 8 turns. The signal was upsetting:

S-meter → 40-42.

Every half hour we could about 5-8 minutes listening. In the meantime, we have always half a turn of Peter S.'s Helical cut. When we approximately 1 turn had flipped, we were able to observe all of an increase in the S-signal. The signal was cleaner and less friable. Finally, there was also Peter S's dish a measured signal strength of around 79. This was when we water 6 windings run arrived. Yet the 81 that we wanted.

Between cutting through was always compared to my dish it remains a gave the signal strength around 81. This was the case. According to the above-mentioned W1GHZ Book online, a Helical Antenna 4 windings to give best results for dishes with an f / D ratio between 0.40 and 0.50.

As the day progressed and Meteosat 7 getting lower in front we could see a Helical of 4 windings no longer tests.

Data parabola Peter Smits:

- Diameter: 1.20 m.
- F = 60
- F / D = 0.50

If preamp also used Peter Smits Minicircuits type ZX60-242GLN.

Note: The S-meter-results should not be seen as a true S-points. Noise gives example. already a meter reading between 6 and 14.

To be continued.

10 MHz GPS reference.

summary
This article Describes a GPS disciplined 10MHz oscillator. A Jupiter GPS module is used. Time and location are displayed with the Arduino microcontroller. A buffer amplifier is used to drive five 50 ohm outputs. When you Decide to build this project, make sure you have the Jupiter module.

introduction
In many testers is a crystal oscillator or a block as a time base. More expensive devices sometimes have a crystal oven. Often it is also a separate entry is provided for connecting an external 10 MHz reference. Spectrum analyzers, measuring stations and function generators often have such a separate entrance.
This article describes the construction of a 10-MHz reference that operates on the basis of the GPS satellites. This reference has five outputs so that multiple devices can be simultaneously connected to the same clock.
Warning: before you frantically doing the building you need to find the GPS receiver. Used here Jupiter TU30-D140 module years ago as an OEM (Original Equipment Manufacturer) sold. Radio exchanges sometimes they do crop up. Look on eBay where they are also offered. It is important that there comes out an 10 kHz signal.

The 10 MHz GPS reference consists of the following parts which I will describe in this article.
An external antenna that is mounted on top of the roof
Jupiter GPS module
Adapter board for the Jupiter GPS module
Arduino display board
GPS PLL designed by Timo Lampe
10 MHz Reference amplifier designed by Timo Lampe

the antenna
For the reception of GPS satellites should have the antenna a clear view of the sky in order to receive as many satellites simultaneously.
My antenna I bought on eBay for as little as 6 euros. It is an active antenna, this means that a 1575 MHz amplifier is in and the signal via a five meter long RG174 brings down. Note that the connector fits the Jupiter module. My antenna cable is a female SMB connector.
The antenna power supply is via the antenna cable and must be between 3 and 5 volts. Just (in a waterproof box / bag) on the roof and lay ready.

Figure 1. GPS Antenna

Jupiter GPS module
The most important part, and unfortunately difficult to obtain, the Jupiter GPS receiver. The module is 40mm x 71 mm. On one side is the SMB connector for the antenna and on the other 2x10 header pins for the connection of the ribbon cable.

Figure 2. Jupiter GPS receiver

This receiver can track up to twelve satellites simultaneously. In addition, NMEA messages are sent via a serial connection, which includes location information. With a backup battery keeps the RTC (Real Time Clock) and memory (where satellite data is stored) are live. The start-up of the module, and the finding of a "fix" is faster than.

The module provides two timing signals: a 1 pps (pulse per second), here I connected an LED and a 10 kHz signal. It is in particular this latter signal that is interesting in that it is synchronized with the atomic clocks of the satellites. The GPS satellites have Cesium137 atomic clocks on board in order to determine the right time and with the place.
It is, moreover, so that the module is always a 1 pps and a 10 kHz signal also emits though there is still no fix. There are at least three satellites in order to make a fix. There are no satellite data in the memory then it may take a few minutes before there is a fix, taken with recent satellite data is a fix in 30 seconds.

adapter board
To connect the ribbon cable (with a pin distance of 2 mm) of the module and Jupiter arrange some other stuff I designed an adapter board. It is a single-sided printed circuit board with a number of SMD-resistors, and is not critical in the construction.
Jupiter needs a power supply of 5V, the external antenna needs that. In total there are about 230 mA. The first copy had a 7805 regulator, but that was pretty warm and had a large heatsink required. That's why I took a switching regulator where all necessary components are already present. It concerns the Recom R 78E5.0-0.5. It can deliver up to 500 mA at 5V. The pinning is equal to 7805 and the heat sink does not need!
Furthermore there are connections for a ribbon cable to the WRX-1700 display, print, backup battery, LEDs and 10 kHz output.

Figure 3. Schematic of the adapter board

Figure 4. adapter board

Just one note on the ribbon cable that goes to the display board. The serial communication takes place, it is possible to use a "USB Serial Light" adapter from the Arduino to see what the Jupiter module for sending all messages provided a verloopadaptertje is made where: TX and RX are swapped and +5 V connection is not connected.
Incidentally come from my Jupiter module only $ GPRMC messages and not the other. This is probably due to a setting. I still wanted to find out how you can change this. For the operation of the PLL or the display does not change.

Arduino display board
The display board of the WRX-1700 I use to show the found GPS coordinates and time. This is important because the Jupiter always outputs a 10 kHz signal and so you want to know if there is a fix.
The board does not have to be completely bestueckt. For example, the header pins K1, K2 and K4 are not required. In addition to the ATMega are the crystal with the two C's, and the parts are needed around the LCD display.
An additional jumper is needed. In the WRX-1700, we assume that the power of the display board comes through connector K2, this design comes from the 5V connector K3 inside. On the buyer side, you have to solder a wire from pin 3 / K3 (labeled VCC) to pin 7 / K2 (labeled + 5V).
The sketch is derived from the sketch as described in the previous Kunstmaan. It is important that the serial communication is carried out at 4800 baud.

```
#include <LiquidCrystal.h>
#include <TinyGPS ++. h>

const int offet_utc = 2;

TinyGPSPlus GPS;
```

```
LCD Liquid Crystal (12, 11, 2, 3, 4, 5);

void setup ()
{
    Serial.begin (4800);
    lcd.begin (16.2);
    lcd.clear ();
}

void display info ()
{
    if (gps.location.isValid ())
    {
        if (gps.location.isUpdated ())
        {
            lcd.setCursor (0, 0);
            lcd.print (gps.location.lat (), 5);

            lcd.setCursor (9, 0);
            lcd.print (gps.location.lng (), 5);
        }

        if (gps.satellites.isUpdated ())
        {
            lcd.setCursor (9, 1);
            lcd.print ("Sat:");
            lcd.setCursor (14, 1);
            lcd.print (gps.satellites.value ());
        }

        lcd.setCursor (0, 1);
        int hours;
        gps.time.hour hours = () + offet_utc;
        if (hours> = 24)
        {
            hours - = 24;
        }
        char buffer [17];
        sprintf (buffer, "% 02d:% 02d:% 02d", hours, gps.time.minute () gps.time.second ());
        lcd.print (buffer);
    }
    else
    {
        lcd.clear ();
        lcd.print ("INVALID");
    }
}

void loop ()
{
    while (Serial.available ())
    {
```

```
        if (gps.encode (Serial.read ()))
        {
           information display ();
        }
    }
    if (millis ()> 5000 && gps.charsProcessed () <10)
    {
        lcd.home ();
        lcd.print ("No GPS detected.");
        while (true);
    }
}
```

GPS PLL designed by Timo Lampe
In the third issue of the CQ-PA in 2005. Timo has written an article entitled "Frequency Reference using a GPS receiver." This article can be found on the Internet at the site of hamforum.nl [1]. Here is a pdf with diagram and PCB layout.
It works by comparing a PLL IC (HC4046) of the 10 kHz signal derived from a 10 MHz crystal with the 10 kHz signal from the Jupiter module. A difference is fed back to the oscillator. When the oscillator lock in the LOCK LED lights.
In addition to a 10 MHz sine wave, there are 10, 5 and 1 MHz square waves are available.
Construction will not pose a problem in itself. The print is double-sided with one side as ground plane acts. The PLL is a combination of through-hole and SMD components. The holes where the wired components go through must be removed carefully with a drill. Do not shoot the print back! Then there are a number of vias to be soldered.

Figure 5. GPS PLL

The adjustment is not really difficult. For me it was so that a GPS fix must have otherwise you do not lock the PLL. Slowly turn the trimmer until you see that there is a flash of the LOCK LED. Then wait a minute, if all goes well, the LED flashes faster you until it remains on. Then turn the trimmer until the point R1 / R19 / C19 is around 4V. Do not have a 10 kHz signal from Jupiter than state at this point 8.4 V.

10 MHz reference amplifier
It is convenient when all your measuring equipment at the same clock can run. Timo has therefore designed an amp that you can connect to the PLL with five 50 ohm outputs. Five parallel sections with a BC547 and 2N3906 take the work on their behalf. Below is a single part shown.

Figure 6. Amplifier for one output. In total there are five.

The construction is not problematic. The design is a combination of through-hole components and SMD components. It is important to have the right BNC connectors for PCB mounting.

In summary,
It was a fun project to do. Especially since you get an accurate reference source which comes in handy for controlling your equipment. Unfortunately, the Jupiter-module is not widespread, but maybe someone knows an alternative.

left
[1] Description on hamforum.nl
http://www.hamforum.nl/viewtopic.php

Arduino - Waiting and Waiting

Ever since that programs are written commands are added with
sole purpose is to wait until something happened. This wait can arise from the
inertia of a piece of hardware or the outcome of a mission.
Within the Arduino programming environment for this purpose there are two commands:
1) Delay (ms); Here are 1000 ms one second.
2) delay micro seconds (us); The maximum value hereby 16383.
Below is an example which shows a blinking LED:

```
void loop () {
    Digital write (LED, HIGH); // Let the LED lit (output + 5V)
    delay (1000); // Wait a second
    Digital write (led, LOW); // Turn the LED off (output 0V)
    delay (1000); // Wait a second
}
```

However, this method has a major drawback, at the time this command is carried
fed the processor can not perform other tasks. For short times in a
small program this need not be a drawback but with longer programs though. by now
to make use of a if () else () loop in combination with the internal clock can be
while waiting to perform other tasks. See the example below:

```
unsigned long rtcLast = 0L;
unsigned long rtcInterval = 250UL;
void setup () {}
void loop ()
{
unsigned long rtcCurrent = millis (); // Time in milliseconds
      if (rtcCurrent - rtcLast> rtcInterval) {// is the time elapsed
         // Run command
         rtcLast = rtcCurrent; // Store the current time
      }
}
```

By setting the variable to zero rtcLast the command is always at the beginning of the
executed program. With rtcInterval waiting time is set.
With several delays in the program, you must for every one and a rtcLast rtcIn-
interval to add the start of the program as in the example below.

```
unsigned long rtcLastDisplay = 0L; Display informative on LCD
unsigned long rtcIntervalDisplay = 123UL;
unsigned long rtcLastRotor = 0L; Used for motor control
unsigned long rtcIntervalRotor = 456UL;
```

More information can be found at http://www.arduino.cc

My HRPT installation Part 2

Summary

This article Describes the HRPT-installation or Ben Schellekens. The interference o f (most likely) GSM signals created some problems with the parabolic dish. An interdigital filter was used to suppress the unwanted signals.

Introduction

Three years ago I wrote the first part by the September Kunstmaan. It's time for an update because since then it has improved and one another. See this article as a supplement to the first part.

The installation work from 2011 t e, but not optimal. One of the problems was that when the satellite toward the zenith, I was lost the signal. The first place to look was the o m antenna rotor, maybe that was not properly aligned.

Antenna Rotor

Because I wanted the mobile installation, I had mounted the antenna rotor on a surveying tripod. During use, you still saw the tripod sagged under the weight of many, particularly if the satellite layer happened. Another problem was that it was not completely waterproof. The initial idea to quickly build the installation and dismantle, also did not really work. The kos t t e a lot of time and I was a lot to carry.

Figure 1. Antenna Rotor on the mast.

Therefore, I decided to make a permanent setup. Only once Adjusting and receive only.

I had a tripod in front of a television satellite dish. With four paving stones this tripod is heavier. The idea was to mount on it and a long tube containing the rotor. Henry came to the rescue and has ordered a 10 x 10 cm plate to a tube. The 4mm thick-walled tube that we bought was di k to mount on the rotor and had to be made narrower. By a strip out of the tube to cutting, then to squeeze in the vise to be welded and, in the end of the rotor fit on the tube.

As a remote construction this too unstable for a tube of 1.50 meters with the antenna rotor. By adopting the tube with heating pipes in the house put an incredible strong construction occur. The heating pipes extend at an angle of about 90 degrees. The tube

endings I've flat in the vise pinched and drilled a hole for a fixing bolt. In the antenna mast, I tapped thread to fasten easily the case.

Fig 2. Confirmation of heating tubes on the mast.

Then put down everything and with aluminum plates and sliding the foot with a spirit all put down vertically as possible. Measure the level in two directions or the tube upright. The mast I painted to prevent rust.

After placing the rotor tired s t it as well as possible be aligned to the north (I have an XY rotor). I did this with a compass. Please note that by many iron readout on the compass may be affected.

So far I h ad not been concerned about the positioning of the dish. Although the mast is level, this aren? T means that the rotor is right. This was therefore still be corrected.

During the construction of the rotor, I measured how many degrees / pulses to the limit switches to go. This value I entered into the program. I did not want to change these values, testing, adjusting, etc. This was not necessary because the rotor of Henry, the genius ability to complete construction on the X or Y-axis to be corrected.

How does this work i k leaves the antenna in the storm position (the zenith) stand and make the X and Y axis separately. Then I turn the dish until both the X and Y axis are perfectly horizontal. S I peer antenna toward the sun, I see that the shadow of the imager is perfectly in the middle of the dish. The installation is properly aligned.

Figure 3. Horizontal alignment of the dish.

The second problem was that the construction was not waterproof. On the one hand, the rotor itself, and on the other side of the cable connections.

With two construction buckets and plastic glue I made a sheath that fits over the rotor and is waterproof. The electronics I have thick PVC tee positioned in a 5cm. The advantage of a tee is that you come across easily and with caps things can close watertight. Tee I have a piece of bent PVC put firmly to the iron pipe.

In a flexible tube cables going to the rotor. Incidentally, the flexible tube is not the type that they fo r Using your electricity because it is not flexible enough, but for sanitary use.

Figure 4. Wiring in PVC tee.

I must say that the rotor is functioning properly. Rain and storms do not claim, the whole can be left outdoors without problems.

Processor Print

The 8052-board is still in use in anticipation of the Arduino variant. An annoying feature of the RAM is that the program is lost if the voltage goes from there. Peter Smits managed to program an EPROM with the program and BASIC. Fantastic, because it just turn on and off on the deal.

The Feed

Despite the good alignment of the rotor was th e problem of poor reception on arrival at the zenith still unresolved. So it was not to the rotor, but where does it?

The vlna of G4DDK I replaced the LNA of Minicircuits the ZX60-242GLN +. The slightly higher noise figure is not a problem because it is in a low pass in the not covered by the noise that comes from the earth. The LNA has 5 Volt and is made with a 7805 stabilizer in the imagesetter.

Compared w ith the receiving system of Harry, I noticed that the S-meter at his installation was not over 80, who have joined me on the 100. This is for two reasons: my dish is 130 cm higher than that of Harry with 80 cm. Another cause could be the preamplifier. Both the LNA of G4DDK as from Mini Circuits have a gain of more than 30 dB. The preamplifier Harrie around 14 dB, this is a big difference. A test with a 6 dB attenuator have indicated that the reception quality was better. As a solution, I have assembled a potme to the UV916 which the AGC (A utomatic G ain C ontrol) by 6 dB was reduced by pin 5 to be adjusted to 7.7 Volts.

Fig 5. AGC adjustment on the UV916.

Despite the lower level of the image disappeared when the satellite came over the Netherlands. The antenna can not lie, this is precisely calibrated to the zenith.

Would irradiation can be? The only way to test this was to use a band pass filter. I am in the happy owner of a interdigita a l bandpass filter by a fellow amateur radio designed specifically for the 1700 MHz. A first test, the filter was placed directly in front of the LNC-1700, gave no improvement. When the filter is placed in the belichterkop on the dish, for the LNA of Mini Circuits, directly behind the helical. A place where you do not want to filter since it weakens the precious signal. The problem of poor reception was solved.

Fig 6. Feed with helical and interdigital bandpass filter.

The preliminary conclusion is that the LNA by interference (eg from. GSM band) is overdriven. Most preferably, I have the filter away from the head because it also adds to the weight of the dish. Henry had at a meeting see a colander which he achieved good results. I want to try to look o f this guard is sufficient to prevent irradiation.

HRPT-receiver

This is of course become the WRX-1700.

HRPT decoder

The new decoder Rob Alblas decoder based on Godil I now use to full satisfaction. A big advantage is the USB connection and improved decoding of signals with noise.

Housing

The downcoverter, WRX-1700 and the HRPT decoder I have built in a cabinet with a single 12 volt power. Everything is mounted on an aluminum base plate of 2 mm thickness.

The cable connections (except the 230) I made all at the front. This is useful if you are experimenting.

The cabinet is a 19 "-. Performance I b ij Elektrodump have reached the height is 44 mm, but this is too little Making / drilling faceplate takes t e a lot of time because it really is all just too tight..

Figure 7. Receiver, downconverter and decoder in one housing.

Software

The software I'm running on a Windows XP machine. Windows 7 I had the problem that Videre occasionally lingered.

Conclusion

In recent years, nevertheless made some steps, but it is not finished yet.

As I said, I go for additional shielding mount a colander in the top of the dish. This is also the time to tune the helical well, something I so far not much thought to have spent. The processor print the Arduino should be, maybe with other rotor drivers.

And then the story starts again from the beginning to receive the AHRPT the Fengyun and Metop programs. We need a larger dish? The receiver is in any case very different. Fits the decoder Godil or should we go to a larger FPGA? Questions we can not answer even now.

ARRL Handbook 2015

At our library, we have added the 2015 ARRL handbook. With more than 1300 pages and weighing more than 2 kg is still crammed with information.

Each year the American Radio Relay League (ARRL) a manual where the basics of electronics, design and construction of receivers, transmitters, etc. are explained in detail.

For example, different filters are described: low pass filters, band pass filters for 145 MHz. These are easy to adjust the 137 MHz.

You read of different designs of Yagi antennas that can be adjusted for the 137 MHz or antennas that are arranged on the 435 MHz to communicate with the Amsat satellites.

Very nice is the chapter (23) on the construction of electronic circuits. In addition to an etched circuit board or a breadboard, there are many ways to quickly and easily build a circuit. The use of SMD components can be found in back there. The chapter concludes with a description of microwave techniques (waveguide) and the construction of enclosures.

Chapter 30 deals with the amateur satellites and the receiving station. The EZ-Linden Leaf antenna for the 2 meter band is described. The quadrifilaire helix antenna is not lacking here. An antenna made of RG-9 cable and PVC pipe for the 137 MHz band is given in section 6.2.

CD ROM

When purchasing the manual you will also receive a CD-Rom with the full contents of the manual as PDF files. In addition, for each chapter attachments included. This can be articles from QST or ancient texts from the textbook that are no longer included.

On the CD-ROM are also many programs that can improve the lives of the amateur.

On the website of the Veron can be purchased the textbook for 50 euros. It is a nice gift for under the Christmas tree to spend with the long winter evenings!