# AMSAT-OZ

## Juli 2007

Nummer 163



**Løst og fast siden sidst.**

Bladet er ikke så tykt denne gang, men Erik og jeg synes, at I skal have en juli nummer alligevel.

Husk at der ikke kommer noget nummer ud i august. Det er ikke posten, der har smidt det væk.

Ud over Michaels interessante artikel er der en artikel, som jeg har skrevet til AMSAT-UK Colloquium. Den er af gode grunde på engelsk. Der er lidt nyt om vores lille satellitprojekt.
Husk også at gå ind på: http://wiki.amsat.dk , hvor der er kommet en hel del nyt i den sidste tid.
Det er stadig tilladt at komme med ideer til hvad som helst i den sammenhæng. Der må være masser af tid til rådighed her i den regnvåde danske sommer ☺

Bent, OZ6BL, Scott, OZ2ABA, og jeg deltager i Colloquium 2007 her i juli måned. Det skal nok blive sjovt.

Opsendelsen af Delfi3 og AAUSAT 2 er udsat til september eller oktober. Mere præcis har jeg det ikke. Det er fra Indien.

Ude på Ingeniørhøjskolen i København har vi en masse studerende på sommerskole. I vores sammenhæng er det mest interessante den, der handler om satellitkommunikation.
Der er næsten 30 studerende fra Spanien og Mexico. Dem har jeg haft fornøjelse af i halvanden uge. Enkelte af dem bliver forhåbentlig fremtidens satellitbyggere. De er i hvert meget interessere-de – så hvem ved.
God Sommer, OZ1MY/Ib

# Informationssiden

**AMSAT-OZ:**
Kontakt AMSAT-OZ på adressen:
AMSAT-OZ
Ingeniørhøjskolen i København.
EIT-sektoren
Lautrupvang 15
2750 Ballerup,
telf: 4480 5133
Ib Christoffersen.
e-mail: oz1my@privat.dk

**AMSAT-OZ hjemmeside**
Brug www.amsat.dk

**Vores mail server.**
Send følgende e-brev:
From: Dit Navn <oz9xyz@udbyder.dk>
To: <majordomo@amsat.dk>
Subject: hvad som helst
Date: 5. juni 2001 09:26
I teksten:
Subscribe amsat-oz-bb

**Indlæg til månedsbrevet.**
Inden sidste fredag i måneden til Erik.

**Styregruppe**
Formand, sekretær: Ib Christoffersen, OZ1MY,
e-mail: oz1my@privat.dk
Arrangementsansvarlig: Ivan
Stauning, OZ7IS
e-mail : oz7is@qrz.dk
Redaktør:Erik Clausen, OZ9VQ,
erik.clausen@postkasse.org
Internetansvarlig: Bent Bagger, OZ6BL
e-mail: oz6bl@amsat.org

**Indmeldelse**
Til adr. ovenfor. 100 kr. pr år. Giro 6 14 18 70
Alle indmeldelser gælder for et kalenderår.

**Satellit DX-info**
Udsendes på amsat-oz-bb.

**Bladet i PDF format**
Hvis du vil have glæde af farver på billeder og illustrationer, kan du få bladet som PDF fil.
Tilmelding til det på vores hjemmeside eller direkte til OZ1MY

**Amsat-OZ wiki**
http://wiki.amsat.dk

**Links til andre udvalgte AMSAT organisationer:**

AMSAT-NA
www.amsat.org
Her er der næsten alt, hvad satellithjertet kan begære.

AMSAT-DL
http://www.amsat-dl.org/index.php

AMSAT-UK
http://www.uk.amsat.org/

Alle de tre steder er der links til mange relevante hjemmesider.
Der er også muligheder for at købe ting og sager samt at registrere f.eks. SatPC32.

AMSAT-SM
http://www.amsat.se

**Kepler elementer**
Kan man få tilsendt fra AMSAT-NA en gang om ugen eller man kan gå ind på:
http://celestrak.com

**Trackeprogrammer**
Der er rigtig mange programmer – men vi anbefaler, at I bruger SatPC32.
Man kan downloade fra:
www.dk1tb.de
Registrering af programmet kan så ske til AMSAT-DL.

**Vejrsatellitter**
Start på Michaels hjemmeside:
http://www.kappe.dk

**Danske sider om rumfart.**

**Dansk Selskab for Rumfartsforskning.**
http://www.rumfart.dk
Der er virkelig mange henvisninger.

**Dansk Rumside.**
http://www.rummet.dk

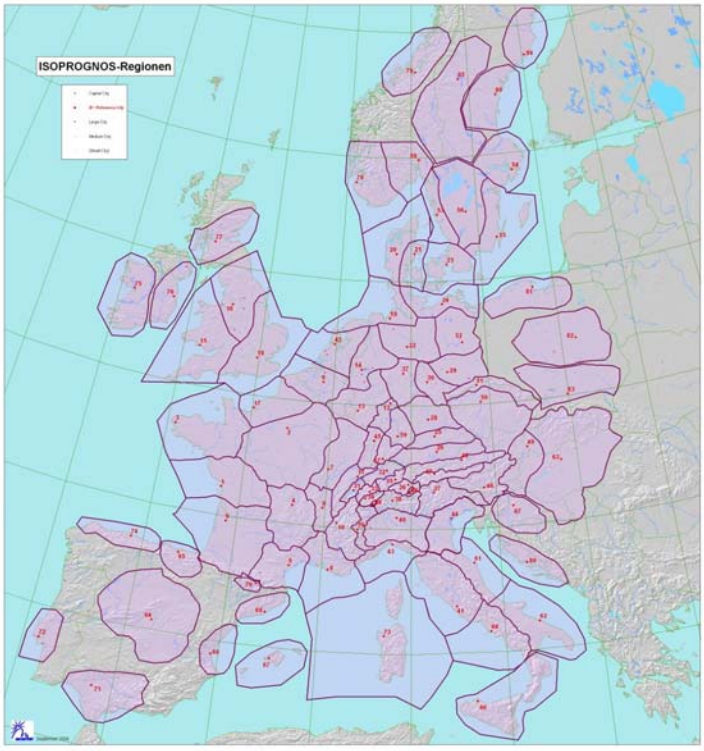
**Dansk Rumcenter**
http://spacecenter.dk/
Det er mest på engelsk

# WX FAX NYT

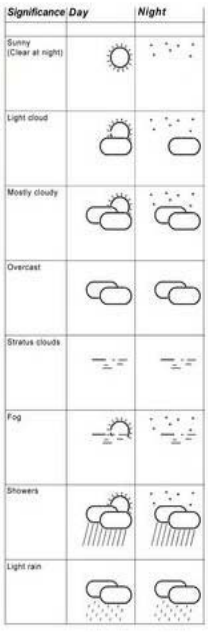
Michael Pedersen....OZ1HEJ E-mail: sne@kappe.dk WX hjemmeside: www.kappe.dk

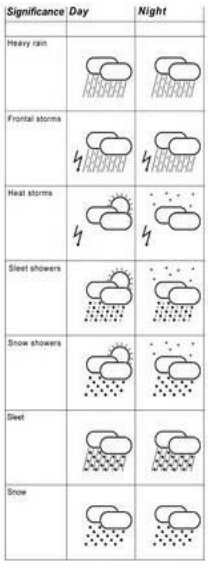
## Trådløs vejrstation.
## Uden eksterne enheder. !

Det lyder lidt underligt, at man kan få lokale data på skærmen, uden eksterne enheder og det er også en sandhed, man skal tage med et gran salt.
Det nye system vejrstationen bruger, hedder Meteotime og bygger på vejrsatellit-data, der bliver behandlet og udsendt sammen med det radiosignal ( DCF 77) man bruger til radiostyrede ure.
En af de ting, der er bedre end på alm. vejrstationer er vejrprognosen.
Normalt vil en alm. VS =(Vejrstation). Kunne vise en prognose, som er baseret på lufttrykket, så hvis det har været faldende i en periode, vil man får en simpel prognose, i form af f.eks. En pil nedad og skyer med et regnsymbol.
Prognosen på den ny VS, er betydelig mere avanceret, fordi den er blevet kørt igennem meteorologiske vejrmodeller, der har betydelig flere data til rådighed, end den simple metode med lufttrykket.
For at få en lokal prognose, har man delt Europa op i ca. 90 forskellige regioner, som vist på understående billede.




"DAY" = Afternoon (around 3 p.m.)
"NIGHT" = Late evening (around 11 p.m.)



Tre døgns prognoser bliver udsendt to gange i døgnet for hver region og der er ikke noget til hinder for, at man stiller sin VS op, så man kan se prognosen for en anden region, end den man befinder sig i.
De simple symboler, er blevet afløst af en noget større serie af symboler, som vist på billedet til højre.
Hvis man nu skal på ferie til Frankrig f.eks., kan man lave en opsætning på sin VS, så man kan se både hvordan vejret og prognosen er, for hvordan det bliver i de næste tre dage.
Det er faktisk sådan opbygget, at der er taget visse årlige vejr begivenheder med i prognosen, som i vind mæsige forhold, kan være den franske mistral vind, den italienske cirocco, og de har også føhn effekten med, men den gælder kun for alperne.

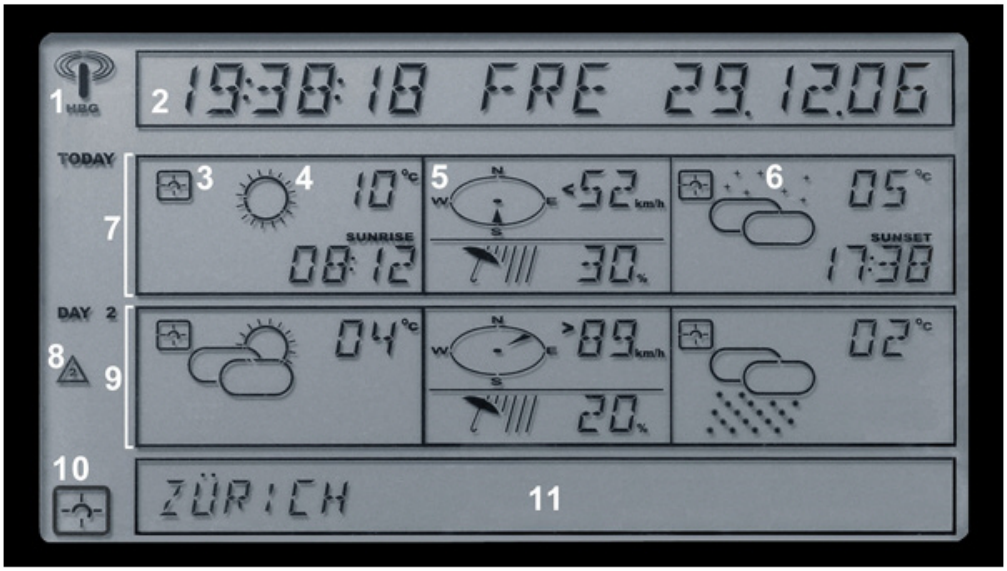
## Lokale vejrdata.

For at gøre aflæsningen af lokale mere nøjagtige, har man delt regionerne op i mindre enheder.
Listen over danske byer, ser sådan ud.

| City | ZIP code | Region | Reference City | Reference Region | ISO code |
|---|---|---|---|---|---|
| Lund | | Malmöhus Län | Kopenhagen | Seeland | DK |
| Ålborg | | Nordjylland | Herning | Nordwestliches Jütland | DK |
| Esbjerg | | Ribe | Herning | Nordwestliches Jütland | DK |
| Herning | | Ringkobing | Herning | Nordwestliches Jütland | DK |
| Holstebro | | Ringkobing | Herning | Nordwestliches Jütland | DK |
| Viborg | | Viborg | Herning | Nordwestliches Jütland | DK |
| Frederikshavn | | Nordjylland | Herning | Nordwestliches Jütland | DK |
| Odense | | Fyn | Arhus | Östliches Jütland | DK |
| Århus | | Arhus | Arhus | Östliches Jütland | DK |
| Vejle | | Vejle | Arhus | Östliches Jütland | DK |
| Kolding | | Vejle | Arhus | Östliches Jütland | DK |
| Silkeborg | | Arhus | Arhus | Östliches Jütland | DK |
| Fredericia | | Vejle | Arhus | Östliches Jütland | DK |
| Horsens | | Vejle | Arhus | Östliches Jütland | DK |
| Randers | | Arhus | Arhus | Östliches Jütland | DK |
| København | | Staden Kobenhavn | Kopenhagen | Seeland | DK |
| Kalundborg | | Vestsjalland | Kopenhagen | Seeland | DK |
| Slagelse | | Vestsjalland | Kopenhagen | Seeland | DK |
| Roskilde | | Roskilde | Kopenhagen | Seeland | DK |
| Næstved | | Storstrom | Kopenhagen | Seeland | DK |
| Helsingør | | Frederiksborg | Kopenhagen | Seeland | DK |
| Herning | | Nordwestliches Jütland | Herning | Nordwestliches Jütland | DK |
| Arhus | | Östliches Jütland | Arhus | Östliches Jütland | DK |
| Kopenhagen | | Seeland | Kopenhagen | Seeland | DK |
| Malmö | | Malmöhus Län | Kopenhagen | Seeland | DK |
| Helsingborg | | Malmöhus Län | Kopenhagen | Seeland | DK |

Et af bynavnene, som står længst til venstre i kolonnen, kan man så vælge at få vist i displayet.
Solopgang og solnedgang, vises også, men her skal man være opmærksom på, at de tider, der bliver vist, ikke nødvendigvis gælder for den by man har stående i displayet, men den by der bliver brugt som reference.

Bor du i Odense, bliver Århus brugt som reference, bor du i Helsingør, er København reference by.




1 Empfangener Sender (HBG oder DCF)
2 Funkzeit und Kalender
3 Empfangsstatus für diese Vorhersage
4 Vorhersage für den Tag
5 Windvorhersage und Niederschlagswahrscheinlichkeit
6 Vorhersage für die Nacht
7 Vorhersage für heute
8 Kritische Wetterlagen für Tag x
9 Vorhersagen für die kommenden 3 Tage
10 Empfangsstatus des PMC
11 Infoanzeige (Region, kritische Wetterlagen, meteorologische Winde)

Billedet viser LCD displayet, fra en Irox vejrstation. Der er flere forskellige finesser i VS, f.eks. Automatisk baggrunds belysning, når den registrerer bevægelse i nærheden.

Du kan se mere om Meteotome systemet på denne link:

http://www.meteotime.com/Web/en/Home/Default.htm

Prisen varierer en del, men hvis man køber den i Tyskland, ligger prisen mellem 270 og 300 Euro.
I uge 25, var den på tilbud i Bilka til 1299. kr.

/ OZ1HEJ

# Danish AMSAT-OZ satellite

by inspiration from Colloquium 2006

A couple of us participated in the AMSAT-UK Colloquium 2006 and heard the "story" about Satellite on a Chip/Satellite on a PCB by David Barnhart. It is a satellite of 100 by 100 by 20 mm.
It must be able to use the P-POD for Cubesats for launch.
I got hooked by the idea and by accident one student, Ali Hussein, was short of a final project and two others, Jesper Hagedorn and Joe Jensen, needed a project for their Engineering Practice during the Autumn 2006 here at the Copenhagen University College of Engineering in Ballerup near Copenhagen.
That was too good to be true ☺
During the spring 2007 a Spanish student, Cristina Laura Oyarzon, from Universidad de Navarra en San Sebastián made her final project on the receiver part of the transponder.
Other participants in the process are OZ9VQ, Erik, OZ6BL, Bent and OZ2ABA, Peter.
But before all that I made some preliminary investigations on frequencies and made some link calculations using the Jan A. King, W3GEY/VK4GEY, spreadsheet.

**Theoretical Link Calculations.**
We in AMSAT-OZ want to make a FM transponder that can be used by some of the standard type of satellite transceivers like the IC-910/FT-736/TS-2000 – may be with a down-converter from 2.4 GHz. They are standard in many stations. With that starting point it means 10 W for the 23-cm uplink in the radio room.
For the antennas the starting point was a station like my own. That means a 2x19 elements cross Yagi on 70 cm (16 dBic), BBQ dish on 2.4 GHz (20 dBi) and two 19 turn helixes on 1268 MHz (18 dBic).
The initial idea was to use 23 cm for uplink and 13 cm for downlink.
Using the orbit of AO-51 as a model, it soon became clear that 13-cm down with such a small satellite was a no go. We would not be able to supply enough power to the transmitter.

**Figure 1. OZ1MY antennas. From left to right, 70 cm 2x19 element Tonna, 2 19 turn helixes for 23 cm, BBQ dish for 13 cm and 2x9 element 2 meter antenna, Tonna.**

Therefor the decision was to investigate the use of 23 cm for uplink and 70 cm for downlink. It turned out that we needed around 200 mW for the downlink. The 23 cm receiver was estimated to have sensitivity of around –123 dBm for 10 dB SINAD – or to put it another way a Noise Figure of less than 2 dB. That should be possible with a narrow band Low Noise Amplifier in the satellite.
With those numbers the links looked very good.
All calculations were done with a range of 2800 km to 3000 km. That corresponds pretty much to 2 degrees of elevation.

**Practical test of the Link Calculations.**
It was very easy to make tests of the downlink calculations since SO-50 transmits 150 mW with just a quarter wave antenna on 70 cm.
I do not think it comes as a large surprise for most of you that it proved the calculations to be correct.
The downlink from SO-50 can be received by an Arrows type of antenna over most of a pass.
2800 km seemed to correspond to a signal just hitting the well-known knee for frequency modulation. If anything it was a little better than the calculation.

The uplink was another matter – just as I had expected from experience. This time I used AO-51 when it was in mode-L/U.
Using 10 W in the radio room – with about half of that at the antennas, the signal received by the satellite at 2800km range was marginal with lots of characteristic "cracks" heard on the downlink.
Since I generally believe link calculations I started looking for the reason for the difference. The answer was the receiver sensitivity in AO-51.
After many e-mails back and forth involving a lot of American friends and Space Quest it turned out that the sensitivity of the SQRX receiver is specified at –117 dBm – but that is at 70 cm.
The SQRX is probably an IC-R5 scanner which is specified at 0.35 μV sensitivity for 12 dB SINAD at 23 cm. This is equivalent to –116 dBm. Voila !
The difference of 7 dB is a little more than 4 times. Fortunately I could offset that by using a 40 W power amplifier. Now it worked very well all the way up to a range of 3000 km.

The conclusion here is that 10 W will do the job with antennas with a gain of around 18 dBic on 23 cm. That is with a cable loss around 3 dB between the transceiver and the antenna.

**KISS.**
Keep It Simple Stupid was the principle we wanted to follow – but with modifications. Since we want to make the transponder available for others to use, we very soon decided to use a frequency agile approach with PLL's on both the receiver and the transmitter.
One good reason for that on the uplink is that the European Galileo (GPS) system is transmitting in "our" frequencies in the 1260 MHz to 1270 MHz range. Therefor it would be good to be able to change the frequency for the uplink in the unlikely event that Galileo will fly.
This subject was addressed during the Colloquium 2006 as well.

**Attitude Control.**
Must be passive to keep the KISS principle. Most probable solution is permanent magnets with nutition dampers.

**Thermal Design.**
This is a large problem with such a small satellite. It may be possible to design the satellite to have 10 – 20 degree C inside temperature when it is in sunlight – but the thermal capacity of the satellite is very small. This will lead to a very rapid decline of the temperature when it is in the shade of the Earth.
We (AMSAT-OZ) have taken down a lot of telemetry from the Cubesat CAPE1 right after its launch and the temperatures went all the way down to – 40 degrees C ☹ Not good for the battery.
Some kind of thermal isolation is needed.

**Antennas.**
A lot of the Cubesats made at different universities all over the World has very elaborate antenna systems that have to be unfolded after launch. In our humble opinion this is overkill and the course of many failures of the Cubesats.

You do not need canted turnstiles with 4 monopoles to have a good communication between your satellite and a ground station. Practical experience shows that a quarter wave monopole will do in most cases. On the 70-cm band a monopole still will have to be unfolded – but that is one only.

If you take a look at a satellite like SO-50 it has monopoles for both the 2-meter band and the 70-cm band and it provides real good communication even for handheld stations.
I have come across projects with very elaborate antenna systems that were there just to fulfil demands for the students at a mechanical department to pass the examination at their university. There is nothing wrong with that – but it is not KISS.

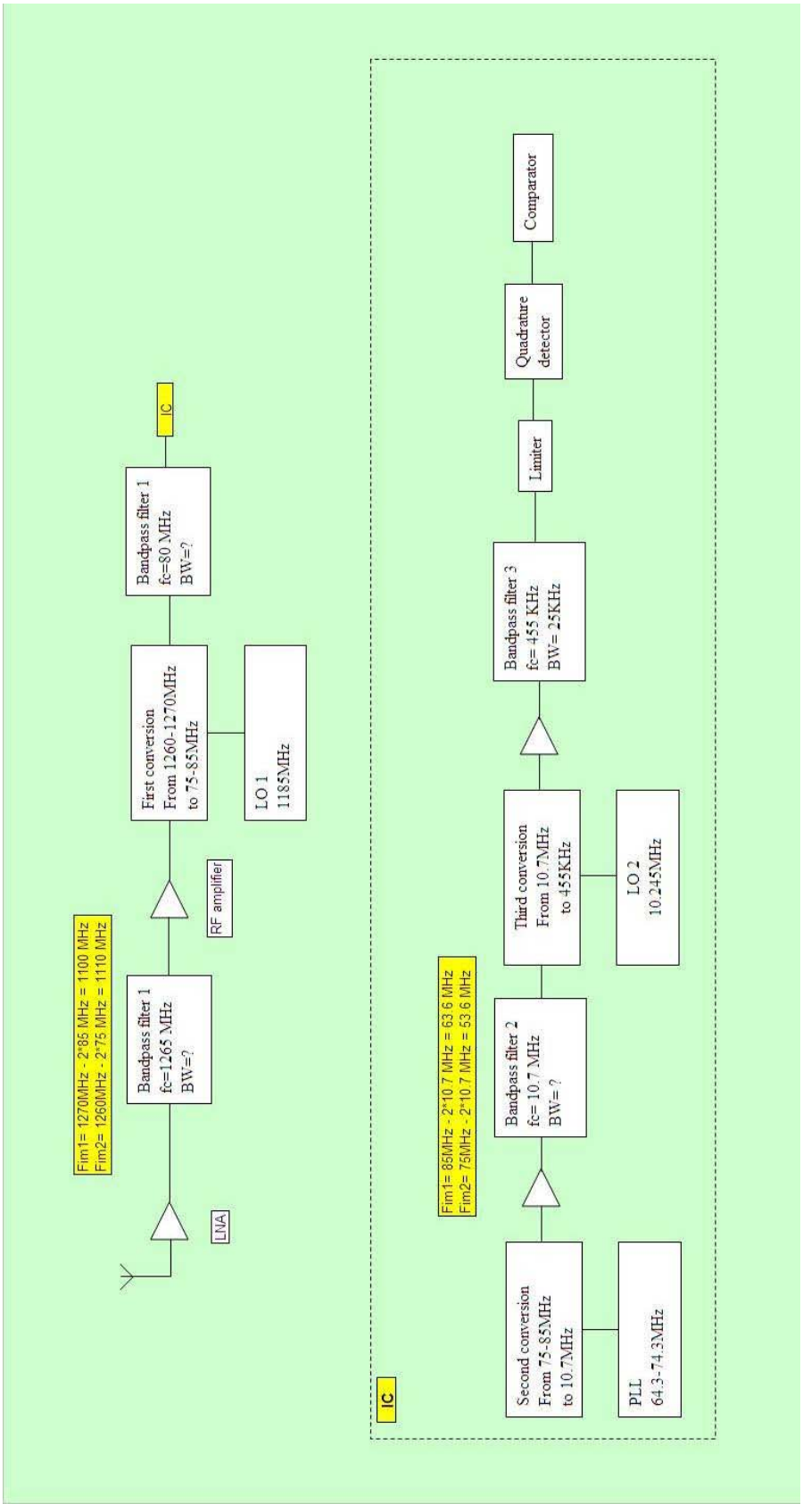
For our satellite we are at the moment looking at using monopoles for both frequencies or perhaps just one antenna for both frequencies.

**First priority is the transponder.**
We have decided that our first priority is to make the transponder. Sometimes there are possibilities to fly a transponder on someone else's satellite.
The idea is to make the transponder flight ready and space proven and make 2 – 3 copies of it to keep on the shelf for someone to use in their satellite.

**Receiver part of the transponder.**
There are not so many IC's for analog FM modulation on the marked any more – but the old MC3363/MC 3362 should be able to function as IF in the receiver. Our preliminary investigation was made by Ali Hussein and continued by Cristina.
Most of the application notes on that chip assume an input frequency around 50 MHz, but it can be used up to higher frequencies. Many have used it as the main building block for 2 meter FM receivers.
Using the hardware designed by Ali, Cristina investigated the possibility to use it for a 10 MHz frequency range around 80 MHz with a PLL controlled oscillator. The reason for going up in frequency with the first IF is to have a larger frequency distance to the image frequency. Fortunately that turned out to be no problem.
After searching around we decided to use the Avago ATF55143 transistor for the low noise amplifier and an active mixer, LT5560 from linear Technology, to keep the drive power for the mixer down.

**Preliminary Specifications for the Receiver Part.**
Frequency range: 1260 MHz to 1270 MHz
Frequency step: 5 kHz
Frequency stabiliy: Better than 3 ppm
IF bandwidth (-6dB): 25 kHz
Noise figure: < 2 dB
Receiver sensitivity for 10 dB SINAD: Better than -123 dBm (deviation +/- 3 kHz)
Received signals will be between –127 dBm and – 97 dBm (guideline only)
AFC range +/- 10 kHz (nice to have)
Power consumption: < 50 mW
Temperature range, operational: – 20°C to + 50°C Must be modified to – 40 $^{o}$ C
Temperature range, storage: - 40°C to + 80°C non-condensing
Mass: ?
PCB footprint: ?
EMC tolerance: Must remain operational in a 2 V/m E-field ???

Blockdiagram of the Receiver Part.
**See next page.**


Fim1= 1270MHz - 2*85 MHz = 1100 MHz
Fim2= 1260MHz - 2*75 MHz = 1110 MHz
Bandpass filter 1
fc=1265 MHz
BW=?
LNA
RF amplifier
First conversion
From 1260-1270MHz
to 75-85MHz
LO 1
1185MHz
Bandpass filter 1
fc=80 MHz
BW=?
IC
IC
Fim1= 85MHz - 2*10.7 MHz = 63.6 MHz
Fim2= 75MHz - 2*10.7 MHz = 53.6 MHz
Second conversion
From 75-85MHz
to 10.7MHz
PLL
64.3-74.3MHz
Bandpass filter 2
fc= 10.7 MHz
BW= ?
Third conversion
From 10.7MHz
to 455KHz
LO 2
10.245MHz
Bandpass filter 3
fc= 455 KHz
BW= 25KHz
Limiter
Quadrature
detector
Comparator

**Transmitter part of the transponder.**
We will try to keep it very traditional with a class C output stage to get a good efficiency for that part.

**Specifications:**
Frequency range: 435 MHz to 438 MHz
Frequency step: 25 kHz (nice to have)
Frequency stability: Better than 3 ppm
Output power: 0,2 W
Unwanted radiation attenuation: better than 30 dB
Deviation: +/- 3 kHz
Modulation: both FM and FSK
Efficiency: better than 33 %
Power consumption: less than 0.6 W
Mass: ?
PCB footprint: ?
EMC tolerance: Must remain operational in a 2 V/m E-field

**Very Premature Preliminary Design Review.**
In May 2007 we held a Very Premature Preliminary Design Review of the project at our College. Besides the group a number of my colleagues with knowledge about solar cells and batteries took part in the event.
One of the main results of the review was that the power system could be simplified. According to my colleagues we can charge the battery, which is one Li-Ion cell, with a constant voltage. That will simplify the whole system. We also decided to use a switch mode series regulator for that.
One reason for that is the experience with SSETI-Express. We do not want to dump power during the first orbit.

**After the review.**
We have looked into subjects like blocking of the receiver by the transmitter or just loss of sensitivity since the two antennas (or just one with a diplexer) are very close.
I have discussed that with David Bowman, G0MRF, and got some good ideas from that. Thanks David.
Also I have made some preliminary simulations of the 70 cm antenna which look good.

**Want to know more ?**
There are some documents on our homepage: http://wiki.amsat.dk

OZ1MY/Ib

# Analog satellitstatus

## juni/juli 2007

**AO-51.**


Vores nye kontrolstation er ved at lære den at kende, så det går bedre nu med at holde planerne. Den har lige passeret et tidspunkt på året, hvor den er mest i skygge. Det er cirka en halv time per omløb – men vi går mod bedre tider, så effekten på senderne kan gradvis sættes op. Den har i øvrigt lige passeret sit tredje år i omløb.
En anden sjov ting er, at mine studerende på sommerskolen i satellitkommunikation fandt en del gammelt materiale om den frem til deres projekt.
De skulle bl.a. finde ud af, hvor stor effekt senderne kan køre med. I det lidt ældre materiale fra 2001 står der, at de kan sende med 6 - 8 W. Det må vistnok karakteriseres som optimistisk ☺ Jeg kan godt huske fra mange indlæg bl.a. på AMSAT-UK Colloquium over flere år.
I denne uge (2. juli til 9. juli) kører den med 490 mW på 435,300 MHz og 370 mW på 435,150 MHz.

I juli bliver der lejlighed til at prøve lidt af hvert. Her er planen:

July 1 until July 31, subject to modification

July 1 - July 9
FM Repeater, V/U
Uplink: 145.920 MHz FM, NO PL Tone
Downlink: 435.300 MHz FM
9k6 Digital, V/U, Telemetry Only
Downlink: 435.150 MHz FM, 9k6 Telemetry

July 10 - July 12
FM Repeater, L/S
Uplink: 1268.700 MHz FM, NO PL Tone
Downlink: 2401.200 MHz FM

July 13 - July 23
FM Repeater, V/U
Uplink: 145.920 MHz FM, NO PL Tone
Downlink: 435.300 MHz FM
9k6 Digital, V/U, Telemetry Only
Downlink: 435.150 MHz FM, 9k6 Telemetry

July 24 - July 26
SSB/FM Repeater, V/U
Uplink: 145.880 MHz USB
Downlink: 435.300 MHz FM

July 27 - July 31
FM Repeater, V/U
Uplink: 145.920 MHz FM, NO PL Tone
Downlink: 435.300 MHz FM
9k6 Digital, V/U, Telemetry Only
Downlink: 435.150 MHz FM, 9k6 Telemetry

We had several requests for normal V/U repeater mode for various operating demonstrations and grid expeditions, but we also managed to fit in a few other modes in between the requested V/U dates. We do have one special request. During the SSB/FM cross-mode repeater July 24-26, please restrict your uplink power to reasonable levels. Last time there were some issues with very strong stations causing distortion on the downlink.

73 and enjoy,
Drew KO4MA
AMSAT-NA VP of Operations

**DSTAR.**
For et par dage siden hørte jeg en mærkelig støj på AO-51. Det er sikkert DSTAR, som nogen har prøvet at bruge over transponderen. De, eller den pågældende var nu meget hensynsfulde, og brugte det kun da satellitten var langt mod nord, så de generede ikke nogen.
Jeg ved ikke rigtig, hvad jeg skal mene om brug af DSTAR, som tilsyneladende kun støttes af ICOM indtil videre. Umiddelbart vil jeg mene, at det er noget junk på en FM satellittransponder, hvis brugerne ikke kan høre andre (FM) brugere. JARL og ARRL støtter brugen af det – men jeg har ikke set noget om brug af satellitter fra dem.
Har sendt en e-mail til de andre i AO-51 komiteen for at få rejst spørgsmålet.
Kontrolstationerne for AO-27 går helt ind for eksperimenter med DSTAR over den. Det kan I se på deres hjemmeside.

# AO-27 does D-Star

On July 1st, 2007 during the 20:00 UTC pass over North America, AO-27 was again providing a new round of enjoyment for Amateur satellite experimenters. Thirteen years ago, AO-27, which coined the term "Easy Sat" by employing an FM bent pipe in space, provided many hams the ability to use a satellite without the expense of multi mode radios.
This time around, AO-27 was used to provide the first D-Star via Satellite contact between Michael, N3UC, FM-18 in Haymarket VA and Robin, AA4RC, EM-73 in Atlanta GA. Signals were reported as strong and easy to copy. Call signs were received digitally on both sides of the link. Communications were possible for most of the pass. Both Robin and Michael were surprised at just how well the digital link was received.
The Analogue repeater on-board AO-27 is well suited for D-Star work. The radios were designed to pass 1200-19200 baud GMSK data. The Analogue mode was not a primary mode of operation in the design. Using a free switch setting in the switching board, the design team hooked up the output of the receiver to the input the transmitter to create the Analogue mode. There is not the normal low frequency filtering that is found in normal FM Repeaters. This means the Analogue mode passes the low frequencies required by D-Star.
The equipment for the contact were IC-2200s on the Uplink at both N3UC and AA4RC, an IC-2820 on the downlink at N3UC, and an IC-91AD on the downlink at AA4RC. Doppler shift did prove to be a minor problem while using these radios. The D-Star signal would decode out to about 1.5 kHz in frequency error. The IC-2820 would only tune on 5 kHz spacing (the 6.25 kHz channels did not fall in the right lo-

cations to help.) so at times we could not decode the digital signals.
For others that want to try D-Star via Satellite we have a few things to keep in mind.

1)
Remember that the FM users can't hear you on the bird.
They hear a strong "noise" but can't decode you. So please keep the D-Star transmitting short.
If you can monitor the FM side, you can time your transmitting as to not step on them.
Please try to schedule with other D-Star users instead of calling CQ for the entire pass.

2)
Watch the doppler, at times you may not be able to decode a signal even if the other station can decode you.
Keep your uplink on 145.850 for the entire pass. Program your radio call signs the same as for simplex, AO-27 does not have a D-Star call sign. You don't need to set up your radio for repeater use.

3)
Before using other satellites besides AO-27, please check with the control operators of those satellites. Every FM satellite may not pass the D-Star signal nor may the control operators wish to have D-Star traffic on the bird.

4) If you hear us on the Bird, please give us a call. We would love to have as many D-Star users on AO-27 as possible.

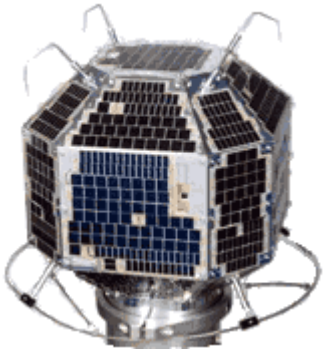
**The AO-27 Control Operators fully support and encourage the use of D-Star via Satellite on AO-27.**

A shout goes out to ICOM for creating Radios for this Fun new Amateur mode of operation. Without their radios we could not have made this contact.

– Michael, N3UC, AO-27 Control Operator

**AO-27.**
Den virker fint – se også ovenfor.

**FO-29.**
Den er i skrivende stund ikke vendt tilbage til normal ”tjeneste” – men det ser ud til at den har det godt, så måske det snart kommer.



Today, JARL executed FO-29 Test Operation.

FO-29
435.795 MHz, CW
Only over Japan
04:24-04:39 UTC, 01 July 2007
13:24-13:39 JST, 01 July 2007
Max ele 45.7 deg

HI HI A2 E2 88 D1 8F 10 05 25 00 24 7C 5B 6F 65 99 9C B0 72 BD B3 B8 BE B9

Main Relay ON : DCM ON
SRAM OFF : Packet OFF

JTA ON : JTD OFF
GAS ON :
SAS OFF : UVC ON
UVC Level 1 : PCU Mode AUTO
PCU Level 3 : Battery Mode TRIC
Battery Logic TRIC :
Digitalker Mode OFF : UVC ACT/PAS PAS
CPU RUN/RESET RUN :
Spin Period 8356.0 [msec]
Sun Angle 72.5 [deg]
GAS-Z 60784.3 [nT]
GAS-X 44607.8 [nT]
Solar Panel Current 1088.2 [mA]
Battery Current -20.4 [mA]
Battery Voltage 16.5 [V]
Battery Middle Voltage 7.5 [V]
Bus Voltage 17.3 [V]
Analog Tx Power 642.9 [mW]
Structure Temp. 1 8.5 [C]
Structure Temp. 2 12.4 [C]
Structure Temp. 3 10.4 [C]
Structure Temp. 4 8.1 [C]
Battery Cell Temp. 10.0 [C]

See for more the telemetry analysis:
http://www.ne.jp/asahi/hamradio/je9pel/fo29test.htm

---
Name: Mineo Wakita / JE9PEL, JAMSAT member
Mail: ei7m-wkt@asahi-net.or.jp
URL : http://www.ne.jp/asahi/hamradio/je9pel/
QTH : Yokohama Japan, GL:pm95tj
Date: July 1, 2007

**SO-50.**
Virker fint og som sædvanlig med færre brugere end f.eks. AO-51.

**VO-52 (HAMSAT).**
Den er også i fin stand og for tiden vores eneste mode-U/V SSB/CW satellit i regelmæssig drift.

**AO-Ø7.**
Er ofte i gang med mode-U/V – men som tidligere bemærket kan man ikke regne med at den er i mode-U/V. Den kan lige så godt være i mode-A.
Den er i øvrigt sjov at lytte til, når der er 70 cm kontest.

OZ1MY/Ib

## Hilsen fra en gammel ven.

Hej Ib.


Tak for bladet.
Ja, jeg har fået mig en IC-910H (e-bay 7.000 kr. inkl. fragt og moms).
Og så skulle jeg hilse mange gange fra denne herre (se billedet), som jeg traf i Dayton.
Vy 73 de OZ5JR Jan

Det var sjovt. Keith Pugh, W5IU, har en del af os kendt i mange år. Han var tidligere international koordinator for AMSAT-NA og en meget flink fyr.
Første gang jeg var i USA til deres Symposium i Orlando, var min kuffert blevet væk, så han organiserede en større indkøbstur, så jeg havde både tandbørste og tøj til de første par dage. Han organiserede også ture til Kennedy Space Center og meget mere.
Han har ofte været med til AMSAT-UK Colloquium i Guildford.
Et par år senere på deres Symposium i Toronto blev jeg guided rundt til det meste af byen med spisning hos en af hans venner, der havde en rigtig god restaurant i byen.
Det er slet ikke så dårligt at være radioamatør ☺

Tak til Jan for e-mail og billede.

**SatPC32 og Vista.**
Der er flere, som har problemer med Vista. Erich har sendt denne e-mail ud om det:

From: "Erich Eichmann" <erich.eichmann@t-online.de>
Subject: [amsat-bb] Re: Satpc32

Hello Don,
on my website, page "Software" you will find a link "Vista compatibility" with my experience with SatPC32 under Vista 32-bit and 64-bit.
Here the section from that text that describes how to change and save the SatPC32 aux. files like Doppler.SQF under Vista:

"a. .....
b. The Configuration of the program with the sub menus of the menu "Setup" generally also works (regarding menu "Observer" see sect. 3).

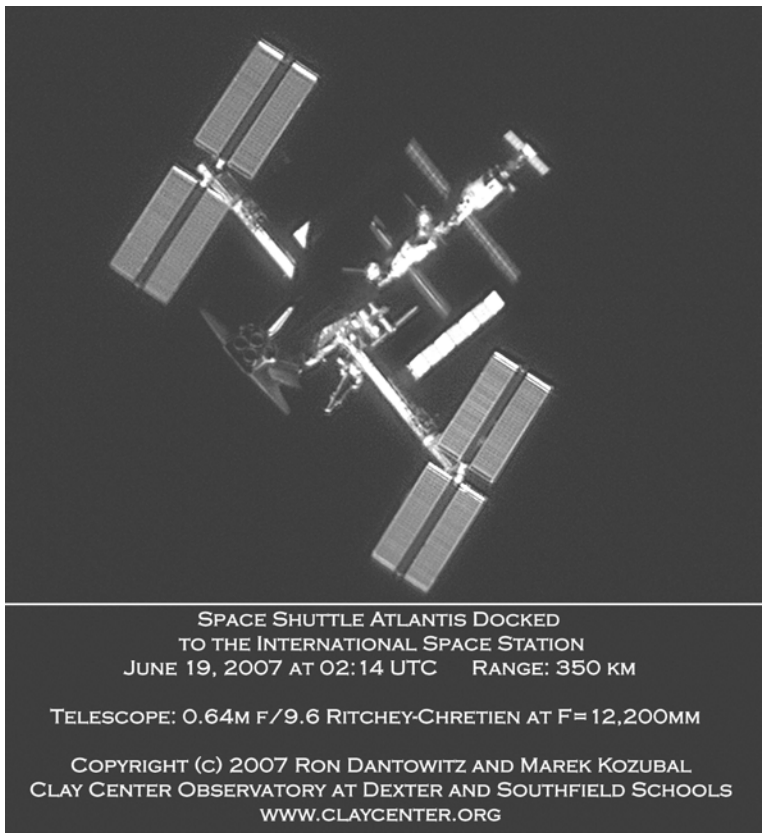
If you want to change an auxiliary file manually you have to consider the new file saving system of Vista, however. SatPC32 saves user specific settings in several auxiliary files in the SatPC32 program folder. With previous Windows versions these files remained in this folder even when they were changed via the program or manually. With changes via the program Vista, however, leaves the original file unchanged and generates a copy with the changes instead. If - i.e. - a satellite's uplink frequency was calibrated with the CAT menu functions Vista will generate a copy of Doppler.SQF that contains the changes. It will save the copy in a "Compatibility Files" folder somewhere on the HD and the program will read

the data from this copy. This folder can't be opened with the Explorer menu "File" / "Open" as usual but only with the Explorer control "Compatibility Files".

If you edit a file manually with Notepad, however, only the original file will be modified and no copy in the "Compatibility Files" folder will be generated.

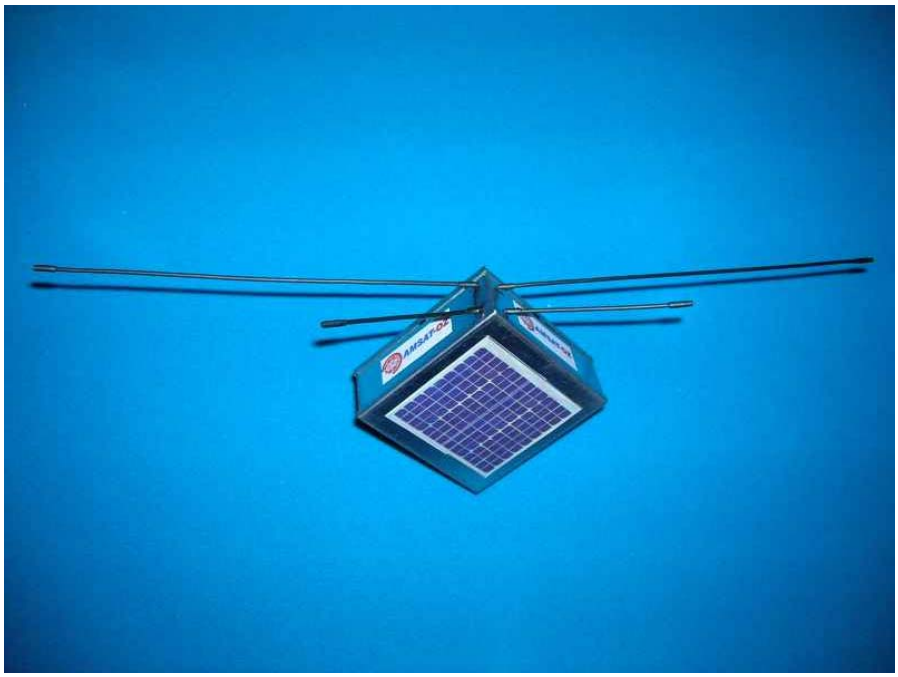
That means: If you want to change a file manually, i.e., if you want to add a new satellite to Doppler.SQF, look first whether there is a copy of this file in the "Compatibility Files" folder. If yes, don't modify the original file but the copy.

73s, Erich, DK1TB




**ISS og rumfærge.**
Det er altså ret sejt. Et billede af rumstationen og rumfærgen koblet sammen taget fra jorden.
Det tror jeg ikke min kones lille kikkert kunne klare. De, der ved noget om kikkerter, kan sikkert få mere ud af de data, der står under billedet.
Jeg har aldrig set noget lignende.

**Mock-up af vores lille satellit.**
Heinz OZ8QS, som også var med til vores Very Premature Preliminary Design Review har været meget hurtig.Han har allerede lavet en model næste i fuld skala af satellitten.
Det er nu ikke sikkert, at antennerne kommer til at være sådan ☺



Samme Heinz har også taget billedet fra OZ7IGY's jubilæum. Dem kan I se på næste side.

Den kom jo igennem FO-29 til manges store forundring, så nu kan vi da sige, at den er blevet endnu mere berømt og satellitrelavant .


Dansk Kabel TV

Why not Study

**ELECTRONIC &**

**COMPUTER ENGINEERING**

*in Copenhagen?*

*Be a student at:*

# Copenhagen University College of Engineering, IHK

**Department of Electrical Engineering and Information Technology, EIT**

*We offer:*

- **A full time 3 1/2-year course taught entirely in English, leading to a B.Eng. degree.**
- **A F.E.A.N.I. degree at group 1 level.**
- **A wide selection of general and specialist subjects.**
- **A higher education experience in high quality surroundings.**
- **An opportunity to meet students from all over the world.**

**For students from new and old EU member states there is no tuition fee.**

**We will help you to find lodging not too far from the College.**

**You can also become an exchange student for one or two semesters (Sokrates)**

**Summer Schools in Satellite Communications for 3 weeks full time.**

**The IHK-EIT is the ideal place for a radio amateur to study because it:**

- **Is the headquarters of AMSAT-OZ, OZ2SAT.**
- **Runs the radio club: OZ1KTE/OZ7E qrv from 1,8 MHz to 10 GHz.**
- **Hosts the AMSAT working group OZ7SAT.**
- **Runs the EME & contest station OZ7UHF with its 8-meter dish for 144, 432, 1296 and 2320 MHz.**
- **Employs a skilled and dedicated staff which includes several radio amateurs: OZ2FO (principal IHK), OZ1MY (President AMSAT-OZ), OZ7IS (VHF manager EDR), OZ5LP, 6BL, 8QS, 8FG, 9OC ……**

## WWW.IHK.DK

## Copenhagen University College of Engineering