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The articles and views expressed by our members, are not necessarily the views of the editor or committee and therefore we reserve the right to modify and or refuse an article if it is considered in the best interest of the club.

MARCH 2006

CLEAR



In this issue:

**WORKSHOP CHATTER
CORRIDOORS II
PHB APPENDIX 2**

CHICHESTER AND DISTRICT

Chichester and District Model Aero Club

Committee 2006

Chairman	Tony Chant	01243 262816
Secretary &	Toni Reynaud	01243 370422
Social Sec.	email address:	tonibr@onetel.com
Treasurer &	Keith Wood	01903 732595
Membership Sec.	4 Buttermere Way, Littlehampton. BN17 6SX	
	email address:	keithwood@supanet.com
Safety Officer	Andrew Gibbs	01243 861804
Competition Sec.	Ray Beadle	01243 670163
Thorney Rep.	Harry Walton	01243 375156
Porthole Farm Rep.	Mick Blundell	01243-670791
Slope Rep.	Ron Hemblade	01243-572819
BMFA Rep.	Ken Knox	02392-593104
Webmaster	Lee Hackett	01243-820689
	email address	lee@cadmac.co.uk
Junior Rep	Gavin Bidwell	01243-861293
	email address	bidwg002@wsqfl.org.uk
CD Editor	Bruce Smith	01243-531602
The Aylings, Queens Avenue, Chichester, West Sussex. PO19 8QB	email address:	aerobruce@aol.com

Committee appointed positions

Snr. Training Offr.	John Riall	01243-782922
Junior Members Protection Co-ordinator:	Bruce Smith	01243 531602

Visit our great website
cadmac.co.uk
Contribute!

Cover photo: Evocative shot of Sandy Woodward's SE 5 as she makes it safely home after a twilight sortie.

Crystal Frequency Survey

LAST CHANCE!

PLEASE RESPOND BY PHONE, EMAIL

SNAIL-MAIL, BY MOUTH OR HAND

IF YOU HAVEN'T ALREADY DONE SO.



Member's Name	
---------------	--

	Glider	Electric	i/c Power
35MHz			
27MHz			

Please return by some method to: email: aerobruce@aol.com
 Bruce Smith, The Aylings, Queens Ave. Chichester. PO19 8QB

DIARY OF COMING EVENTS

The following is a list of proposed CADMAC Club events for your information

Legend: Club-nights Outings Competitions Others

March	09	Club Auction
March	11	Climb/ Glide I/c only. Thorny
April	13	Indoor Flying Competition
April	15	Slope Comp Trundle
May	11	Skittles and Buffet Evening
May	13	Bomb Drop Thorny
June	08	Outdoor C/L R/C F/F Flying Night
June	17	Electric Glider Porthole
June	24	Wings and Wheels Club Outing
July	13	Outdoor C/L R/C F/F Flying Night
July	15,22, 29	Open Glider Thorny
July	29	Hastings Show Club Outing
August	10	Outdoor C/L R/C F/F Flying Night
Aug	12	AULD Porthole
August	19/20	Royal Victoria Park Event
August	26/28	BMFA Nats - Barkstone Heath
August	26/28	NO ACCESS TO THORNEY
September	14	TBA
September	16	Hop Farm Show Club Outing
Sept	23	Scale Thorny
October	12	Club Auction
Oct	14	Loops/Rolls/Spins Thorny
November	09	John Farley talk - materials
December	14	Annual General Meeting

LIFE MEMBERSHIP AWARD



Alan Misselbrook (left) receives his Life Membership Award from CADMAC Chairman, Tony Chant, at the February Club Meeting.

Alan has been a member of CADMAC for 20 years and served on the committee for 16 of them until he retired as Treasurer and Membership Secretary in December 2005.

His main interest is the building side of aeromodelling and though he flies gliders by preference poor health and mobility problems have kept him off the flying sites too often this last couple of years.

Editorial

A LETTER TO THE EDITOR

Hi Bruce

It comes to mind that CD does not carry a regular formal Forum section, where members could share ideas/experiences, and ask questions that are seen by all. I think the latter point is very important, because comments/queries routed to the Committee often disappear forever. I think it would aid democracy

in the club. What do you think?

Keith Stanley

Great idea Keith. Who's going to set the ball rolling then with some suitably contentious topic or tantalising question?



Don't forget It's your mag.

Bruce

**Minutes of the
Committee Meeting
Tuesday 6th December
from Toni Reynaud
Hon Secretary**



Present

Tony Chant, Keith Wood, Toni Reynaud, Ron Hemblade, Gavin Bidwell, Mick Blundell, Ray Beadle, Bruce Smith, Harry Walton.

Apologies for Absence

Andrew Gibbs, Ken Knox

Matters arising from previous minutes

There was talk about the role and function of Instructors vs Minders. The list of current members authorised to stand with non-A cert flyers was discussed – this will change as members go on and off, and updates will be notified through Clear Dope. Keith W is to contact BMFA and ask for copies of “General Notes for Instructors”.

Correspondence

Letter received from Worthing Library asking to confirm club contact details for their list of clubs. Lee’s email address was confirmed as the contact. As an aside to this, the website will be updated to include Committee members’ email addresses.

Letter received from BMFA notifying the requirement to comply with Children and Vulnerable Adult Protection Policies and Procedures, containing a questionnaire. Answers filled in with reference to Bruce S and Tony C, reply sent. Noted that the presence of an asbestos roof at Porthole Farm might possibly be an issue.

An up-to-date membership list was placed at the Thorney Island Gatehouse. It will be regularly updated as membership and car registration numbers change. Flying at Thorney Island will not be allowed over the weekend of 25th to 28th August due to a Parascending competition.

Several members had received letters asking for subscriptions to the Fishbourne Social Club. There was discussion on the cost of this subscription, but it was resolved in private conversation with the Chairman of the Social Club after the Committee meeting was finished.

Club/Membership issues

A decision was confirmed that the Club will only accept members from West Sussex and the P09 and PO10 areas of Emsworth. The list circulated by Keith W was discussed and approvals and rejections were agreed. Keith W will contact the approvals. This year so far, 99 members have re-joined. More are expected to rejoin at the February meeting.

Monthly meetings/social programme

**FURTHER EXTRACTS FROM THE T&R ENCYCLOPEDEIA
OF MODEL AERONAUTICAL TERMINOLOGY**

MEAN AIR CHORD - That nasty minor eighth note caused when your wings snap on launch and whack together.

MIXTURE SCREW - Device to meter too little fuel to engine at critical moments.

MONOKOTE - The thing that ruins every ounce of hard work that you put into a plane to make it look nice.

NOSEWHEEL - Implement used to remove bulkhead.

O.S. - Initials of the two words that an r/c pilot says when he loses control going straight down.

PATTERN PLAN - Make a copy of the plans so when it crashes, you have the patterns to build another one.

PROPELLER - Rotating knife that cuts holes in the air, which the aircraft falls into, thus propelling the aircraft.

PROPELLER - Also : Handy tool to cut away excess skin on knuckles.

PROP NUT - What Glider pilots call Power pilots.

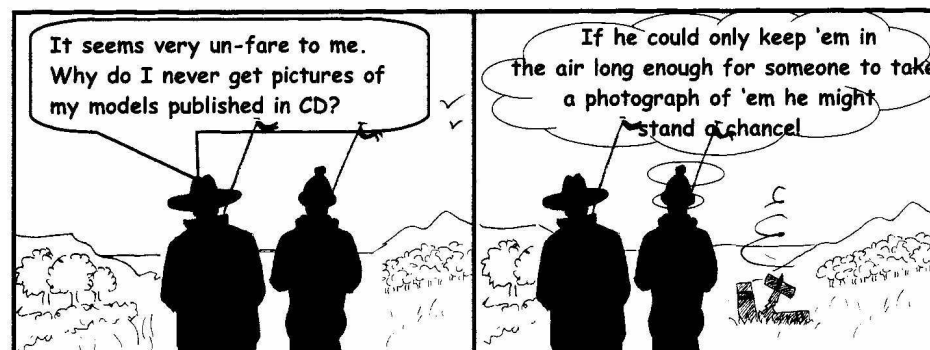
P-51 MUSTANG - What beginners use to learn to fly.

RADIO- Expensive electronic device to randomly alleviate overcharged batteries.

RADIO GLITCH- Documented Electronic occurrence, causing immediate and irreparable loss of control.

RADIO GLITCH- Also : The source of any crash when there is a possibility of someone else’s radio in close proximity to the plane.

TeX & ReX by Ecurb



MY SHACK



Since Erik Gregory moved to Hayling Island it looks like he's moved up in the modelling world - I bet his shack is centrally heated! Very impressive Erik, with meters, oscilloscope and a pc. Wouldn't be any good in my shack as everything is permanently coated in half an inch of saw dust. (Ed.)

INDOOR FLYING

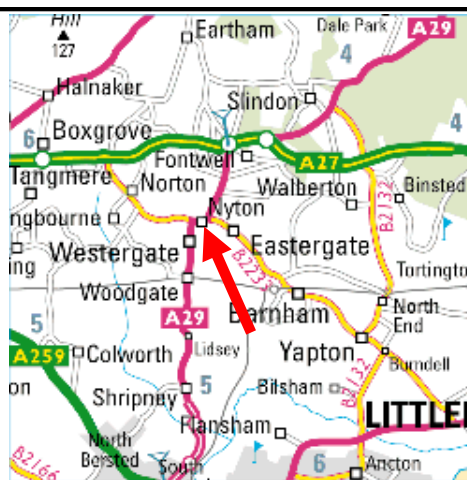
SUNDAY 2nd APRIL

2.00 pm to 5.00 pm

Westergate Community School

Four badminton courts

Entrance £5.00 per member



February Aeroplane Quiz / Safety Night – in the absence of Andrew G, Bruce will run this quiz.

March Club Auction – to be run by K Keith W and Toni R. Auctioneer to be decided. Toni R to notify other local clubs. Keith W to send sheets in advance to Mike Burton.

May Skittles Evening – the room and Skittle Alley have been booked. A finger buffet will be provided.

Outside Events

The minibus has been booked for visits to Wings and Wheels on 24th June, Hastings Model Air Show on 29th July, and The Southern Model Air Show at Hop Farm on 16th September. Dates to be publicised in Clear Dope.

Competitions

Dates for this year's competitions are:

March 11th Sat	Climb/ Glide l/c only.	Thorney Island
April 15th Sat	Slope Comp Details On Day	Trundle
May 13th Sat	Bomb Drop	Thorney Island
June 17 th Sat	Electric Glider	Thorney Farm
July 15 th , 22 nd , 29 th	Open Glider	Thorney Island

Aug 12th AULD Thorney Farm

Sept 23rd Scale Thorney Island

Oct 14th Loops/Rolls/Spins Thorney Island

Ray B to confer with Bruce S to agree certificate design and wording so that BS can provide them for each comp.

Training

Ray B and Mick B have four or five members under training at Thorney Farm. Trainees at Thorney are improving.

Safety

Nothing to report.

Communications

Bruce S reported that he is on track for producing the February CD. The printer has reported a full waste ink tank and has stopped printing. Rectification is in progress.

Lee is still looking after the website. Bruce S to send committee photos to Lee for inclusion on the site. Tony C requested that links to Selsey Model Boat Club be removed, as they are not reciprocating.

Thorney Island

The bin by the C/L circle has been destroyed. There was no equipment in it. Pieces to be removed at some stage.

Pass management at the gate was variable but most people were getting access OK.

Communication with the Parascending Group is good. They have requested that we take the numbers of any low flying aircraft.

Some pilots are suffering interference at specific places in our flying area. The frequency monitor is to be taken to the field as soon as possible, and advice is to be sought from those within the club who are known to have expertise in this area as to possible causes and cures.

Trundle

Reported that Meon Valley Soarers members had been using power assisted models on the site. Ron H to talk to them to resolve this issue.

Porthole Farm

New pegs made by Gavin B.

Indoor flying

Mick B reports no replies from Seaford College about dates for the use of their hall. He will try further contacts.

Gavin B has produced a map showing how to get to the Sports Hall at Westergate Community School. Membership to the hall is free, and there will be no Administration charge.

Junior matters

Nothing to report

BMFA

Nothing to report

AOB

Tony C Suggested the Alan Misslebrook be awarded Life Membership in recognition of his work for the Club over many years. Agreed by all without reservation.

Ray B asked whether BMFA Insurance covers members flying at another site (with the permission of the landowner), even if they don't have an A cert and are flying alone. Keith W to contact BMFA and confirm. (Keith subsequently emailed the BMFA the following: Could you please advise on the following question which arose at our Club Committee meeting last night. Q: Can Club/ BMFA members fly at sites not operated by the Club (say a local farm) and be covered by BMFA insurance?

BMFA Response: You can fly anywhere as long as you have got the land-owners permission and you abide by the local byelaws.

Date of next meeting. Tuesday 7th March 2006

Toni BR

Handbook Appendix 2

List of Examiners, Instructors and 'B' Fliers at 02/06

1. Registered Area Chief Examiner.
John Riall.
2. Registered CADMAC Power Fixed Wing Club Examiners.
Tony Chant. Robert Horton. Stuart Whittle
3. Registered CADMAC Silent Flight Club Examiner.
Tony Chant. Ron Hemblade
4. Registered BMFA Approved Power Fixed Wing Instructors.
Tony Chant. Peter Daer. Keith Stanley.
5. Registered BMFA Club Instructors Power Fixed Wing.
Ray Beadle. Mick Blundell George Chant
Adrian Childs John Fowler Andrew Gibbs
James Honeybourne Alan Litchfield Greame Ousby
Mick Pearce Kevin Porter Steve Skinner
Bruce Smith Harry Walton Stuart Whittle
6. Registered BMFA Club Instructors (Heli)
Graeme Ousby
6. Registered BMFA Approved Silent Flight Instructors.
Mick Blundell. Tony Chant Keith Stanley.
7. BMFA B Certified Flyers (Fixed Wing)
Chris Barnes Ray Beadle Tony Chant George Chant.
Adrian Childs. Andrew Gibbs James Honeybourne.
Alan Litchfield. Graeme Ousby Mick Pearce.
Kevin Porter. Bruce Smith Keith Stanley.
8. BMFA B Certified Flyers (Heli)
Trevor Burley Graeme Ousby

Please note that the above list of CADMAC members are available to train or supervise persons who do not have at present a BMFA A certificate for power fixed wing flying.

NO OTHER PERSONS ARE TO TRAIN OR SUPERVISE CLUB MEMBERS ON CADMAC CLUB FLYING SITES.

Electric Competitions

From Ray Beadle - Comp Secretary
New rules for the 2006 Season

Auld.

After every 30 min come down to 20 Feet.

Max 10 min.

Class 1, Cad/Mnh sub C cells + brushed motors.

Class 2 Lipo cells + brushless motor.

Run times, 7 cells 2min, 8 Cells 1.5 min, Lipo cells 1min.

Multi round.

Max cell size Sub C or 3 Lipo 3700 mah

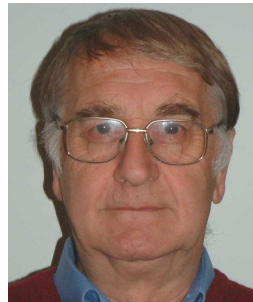
Round 1 3min

Round 2 5min

Round 3 7min

Round 4 Last down

Motor may be run as long as you like in any round.



BEWARE ! SAFETY HAZZARD!



No, its not as bad as it looks. Bill Honeybourne stitched me up with this very realistic photo montage by superimposing Pete Wills' Spitfire on the runway.



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New for March:

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- Cessna 182

New Electrics:

- Spitfire
- Mustang
- Pitts
- P38 Lightning

For further information or enquiries please e-mail sales@planenutz.co.uk or call Pete on 07976 041034 or Morris on 07812 682358.....who are Plane Nutz

Gibbs Guides

User friendly guides by Andrew Gibbs

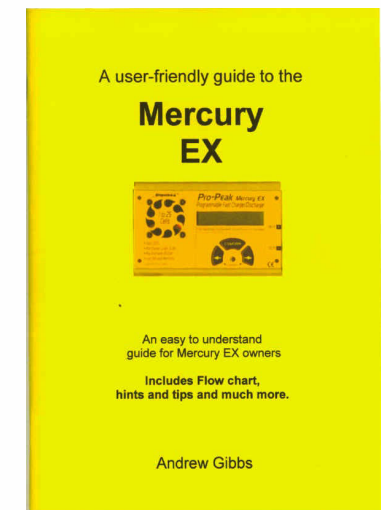
Lithium batteries	£7.75
Nicad and Hydride batteries	£6.75
Mercury EX	£6.25
Super Nova	£6.00

Cadmac members may enjoy a £1 discount on above prices when buying at a club meeting.

Latest Release

Gibbs Guide to Lead acid batteries

Andrew Gibbs 01243 861 804



Beware the Corridors of Power - Follow-Up

The kind of interference quoted in the recent CD item seems typical of the growing number of instances of minor glitching we have recently experienced on Thorney. It's easy to put these down to stray gusts, but of-late some identifiable glitches have shown otherwise. These have occurred in localised areas, so the concept of what the author calls "Pipe Interference" seems very justifiable. If these areas of interference take the form of "pipes", flying directly through them has generally proved to be only a little disconcerting, but flying along the core might account for some of the more spectacular accidents we have experienced. This note is an attempt to examine what might be going-on, and hopefully to see what we can do about it.

I thought the article contained a lot of sound advice, but I would like to question a couple of the author's statements.

1/ He states that the areas of these "pipes" are the same as that of the radiating dishes. This is an over-simplification that misleads. Practical and physical limitations prevent microwave aerials from being able to generate laser-like beams. If they were, only minuscule transmitter power would be required, sufficient just to overcome path absorption. Also, how could alignment with a distant dish be maintained, especially in windy weather? The beam is divergent, and the beam angle will depend on the operating frequency and dimensions of the dish. To back-up these comments, I went to <http://www.spawar.navy.mil/sti/publications/pubs/tr/1719/tr1719.pdf>, which proved to be most informative, and well worth a look. The data here shows that antenna beamwidths for most applications are likely to be several degrees, but some specialised installations provide beamwidths of about 1.0 degree, and we would expect to find these in satellite communications. Even at this narrow angle, a quick sum shows that the beam would be about 17m across at a distance of 1000m from the dish. The author's graphic should show a slightly divergent beam to be representative.

2/ The author makes a good case for screening using a Faraday Cage for this kind of interference, where high-energy signals penetrate the plastic case of the Rx to affect the circuit board. However, I disagree with his statement about it not affecting the tuning. It can do that if the screening is in very close proximity to its components. It doesn't have to be in contact to do this, since the shielding can represent a shorted-turn to the tuning coil, and thus slightly reduce the coil's inductance. I would always recommend a range-check after doing this kind of modification.

The author notes the particular sensitivity of PCM Rx decoders to this kind of interference, but it would be as well to assume that that multi-carrier signals



looks as near the original as possible. If I hadn't built it so quickly I could have copied Derek's parts. Sod's Law, that! A ready to fly weight of two and a half pounds was spot on the design weight. The specification 'ballasted weight' says five pounds but I don't think I'll try that out without a force five blowing. I have not flown it yet but I do intend to be 'slope-side' more this year. I have just completed a YT Hurricane for Mick Jones, so next month I'll scribe on that. Also I have just obtained a Lancair 52 from 'Plane Nutz' - where else, of course? The contents looks a quality product so there'll be a report on that to come too.

The trouble is, I keep putting off finishing my 'Giant Jabberwock' which is to be used as a towing tug.

Exciting times ahead -

so long as it doesn't reach the loft!

A handwritten signature in black ink, appearing to read 'John Smith'.

WORKSHOP CHATTER

From John Riall

Well I don't know what's on your building board but I keep building models then find there's less room to store them and usually have to sell a couple to make room. Having written off two last year— a control liner and the Aerovan Twin—both total. The twin's mid-air was a vertical descent, even two rear battery cells damaged, wrecked one 480 motor, even bent the speed controller's heat-shrink. Not a mark on the other aircraft but I did find a tyre mark on my tailplane.

Another problem is shelving un-finished models. We're all guilty of this. If they get as far as the loft, they never do get finished. But one surprise came out of Colin Steven's loft the other month. We were reminiscing on our Thorney patch about 'Solent Sailplanes' range of models and wishing that were still available - the Ridge Rover, the Ridge Racer and the Ridge Recruit. Back in the late 1970s, Colin was flying the Ridge Recruit on Harting Hill. It would stay up on the lightest wind while most of us were grounded. Colin said, "I have the fuselage of one in the roof, I'll dig it out for you. Bless his woolly socks! Before the AGM a bubble wrapped fuz moved from one car boot to another.

The following day I was unwrapping the parcel and thinking it was from an old model but No. It was a brand new one and with a canopy, too. Colin had also plotted rib sections and technical sheet details too. Christmas had come early! This whetted my appetite to build it and I'd drawn up a wing plan and cut out a set of ribs before the week was out.

The next Sunday, Derek Honeyset said, "I have a complete kit in the loft." - he would have - spends too much time on Ebay rather than building! The Ridge Recruit had rudder and elevator control only. The Racer had aileron and elevator control with a shorter span. I wanted a light wind soarer with aerobatic potential so something in between was called for. I had to guess at the wing sweep, aileron size, tail feather dimensions. I reduced the dihedral to one inch and the finished item

within some beamed transmissions could be troublesome to a PPM Rx as well.

Proof of the Pudding? - has shielding work for us so far?

Bruce Smith has had the misfortune of several terminal adventures of this kind, in spite of foil-wrapping his Rx's. There may have been other complicating factors here however, e.g. the use of ferrite rings and the proximity of the aerial to the servo leads.

After suffering minor glitches, I foil-wrapped the Rx in my Colibrio. On the basis of my flights of 05/02/06, I was ready to record complete satisfaction having experienced no trouble at all. But I am sufficiently long in the tooth to be forever aware of the Sucker Punch, which translates to experiencing big problems on 11/02/06, where glitches opened-up my engine in one location, and twice nearly rolled my model into the tarmac when turning-in to my landing approaches. Clouding the issue here may be the way I took short-cuts with my foil-wrapping, since I used sticky-backed aluminium foil in 3 pieces, all well-overlapped. Not technically the best solution, but trusting that the capacitance of the overlaps would provide sufficient electrical continuity at the 2GHz-and-above frequencies concerned. A range test showed that in my case the performance had not been affected.

Well, the screening doesn't seem too impressive so far, eh? Why might that be?

- Mike Notter warns that multi-GHz energy conducted into the cage by the cabling could excite internal cavity resonance modes if the frequencies and cage dimensions correspond. This presents a great risk of the shielding making matters worse.

- The interference could be conducted into the Rx, rather than radiated, via the aerial and/or cabling paths. It doesn't have to be in-band, since if the levels are high - as you'd expect in a narrow beam - the Rx can be desensitised. You might say that it has the life strangled out of it.

- When we look at conducted signals at the aerial, straightaway we have to consider Image Response. Conventional single-conversion Rx's are poor at rejecting signals at the image frequency, since they are only $2 \times \text{IF} = 910\text{kHz}$ away from the wanted response. The physics of the simple front-end tuned circuits used doesn't allow them to be adequate. Very much greater rejection is achieved when a much higher 1st IF is used, as in a dual-conversion Rx. In the high interference environment at Thorney, we might as well regard the single-conversion Rx as a 2-channel Rx, receiving the wanted channel and the interfering channel simultaneously. Since the interfering channel lies within an assigned military communications band, the implications are obvious. In my Colibrio screening tests, image-frequency interference could have been the culprit, although this doesn't tie-in too well with the very localised interference. I'm using a JR single-conversion Rx that employs ABC & W ("Automatic Blocking Circuit with Win-

dow") technology, promoted to enhance its image-rejection. This system is quite an enigma because no actual image-rejection performance figures seem to be available, and it's difficult to see how it defeats capture of the Rx by a much larger competing image signal. It is said that extreme crystal precision is essential, requiring matching JR crystals in the Rx and Tx, also requiring the use of a JR Tx. My use of a Futaba Tx and crystals conflicts with this, whilst still giving good range and performance. To this extent I've not given it a fair trial. However, I'd be fascinated to know how it defeats what to some of us is fundamental physics - someone up-date me, please.

- There are other spurious responses of the Rx involving harmonics of its local oscillator/s and input signals. These should not be dominant when compared with the image response, but we need to be wary of fortuitous hits from local military/civil transmitters.

Recommendations:

This is a big subject that clearly has some way to run yet. We can't start to identify a fix until we have crucial data about the interfering frequencies involved. In the meantime, let's see if we can frame some interim recommendations for safer flying at Thorney, which must be regarded as a "hot" site.

1/ Use dual-conversion Rx's. This won't be popular with all, but it has to be said that the vulnerability of the conventional single-conversion Rx to image responses presents a latent risk. Tolerable for gliders and light electrics, maybe.

2/ Use foil-wrapping by all means, but make sure that the material is in a single piece, well-over-lapped. It could do a good job in excluding high-level signals that are otherwise blocked by other means. Also be mindful of the possibility of cavity-mode problems.

3/ Use a receiver design that is specified to be able to tolerate high signal levels. So far I've only found "Micron" highlighting this kind of Rx. Many of you will know better, so please let us all know.

4/ I think the jury is still out on PCM vs PPM. Old-fashioned PPM still has a lot to offer, for its near-instantaneous recovery from glitches, and the warning that it gives that the received signal is deteriorating. Thus you have some chance of flying away from the problem. Everyone has their own preferences and priorities.

Micron has a very interesting DSP Decoder that de-glitches a deteriorating signal, and applies a choice of fail-"safe" options, settable whilst flying, if required. These options are available by having its PIC device re-programmed. See the PDF file download at

<http://www.micronradiocontrol.co.uk/docs/StdDSPDecoder.pdf>.

Be ready to get into many arguments with yourself, though.

5/ There is always the option of trying a different channel if others are enjoying glitch-free flying.

6/ If the above measures don't help, try to angle the Tx aerial into reasonable alignment with the Rx aerial when flying into known areas of vulnerability. The signal margin calculated by Mike Notter in his July 2005 contribution is only

modest, and then only under electrically-clean conditions. The presence of interference really put us on the back foot.

Further Actions:

We badly need to know the frequencies of the interfering emissions, and ideally, where they are coming from. We have to do this without breaching our conditions of use of the airfield, so Committee help is vital here.

Let's see if we can find a way of sharing information on these "hot-spots", i.e. location, height, channel affected, single/dual conversion. Fred Minay has come-up with the suggestion that we could enter this on a site map, maybe at the club meetings.

Some of us have been enjoying glitch-free flying, so it would be very valuable to know what channel/receiver-type combinations are providing secure control.

For those who wish to contribute, there is plenty of scope for fresh work on ways to exclude high-level signals from the Rx aerial and battery/servo wiring paths. More knowledge about the screening cavity-mode risks is a high priority. An analysis of spurious responses for single and dual-conversions Rx's is also required. In addition to Thorney's specific problems, mobile phone masts and point-to-point communication aeriels are sprouting-up all over the countryside. This has projected us into an era where the limited power of our Tx's no longer guarantees adequate performance margins. Manufacturers are unlikely to improve Tx power as this would upset a level playing field, at least in the short/medium term. It therefore falls to us to see what we can do with our Rx's. It could be very productive if manufacturers would metal-plate the plastic Rx boxes, or replace them with light metal enclosures. Not only would the shielding be valuable, but it opens the way to providing much more effective filtering. After all, military, avionics, and space communications equipment has always needed to be done this way. So why not our expensive flying toys?

Colin Stevens

