Wookey
wookey@wookware.org

BCRA Tech symposium 2008
Mendip

# What is this talk about?

- LED Technology review
- Wook's lights
- Light review
- Issues arising

# What is this talk about?

- LED Technology review
- Wook's lights
- Light review
- Issues arising

# What is this talk about?

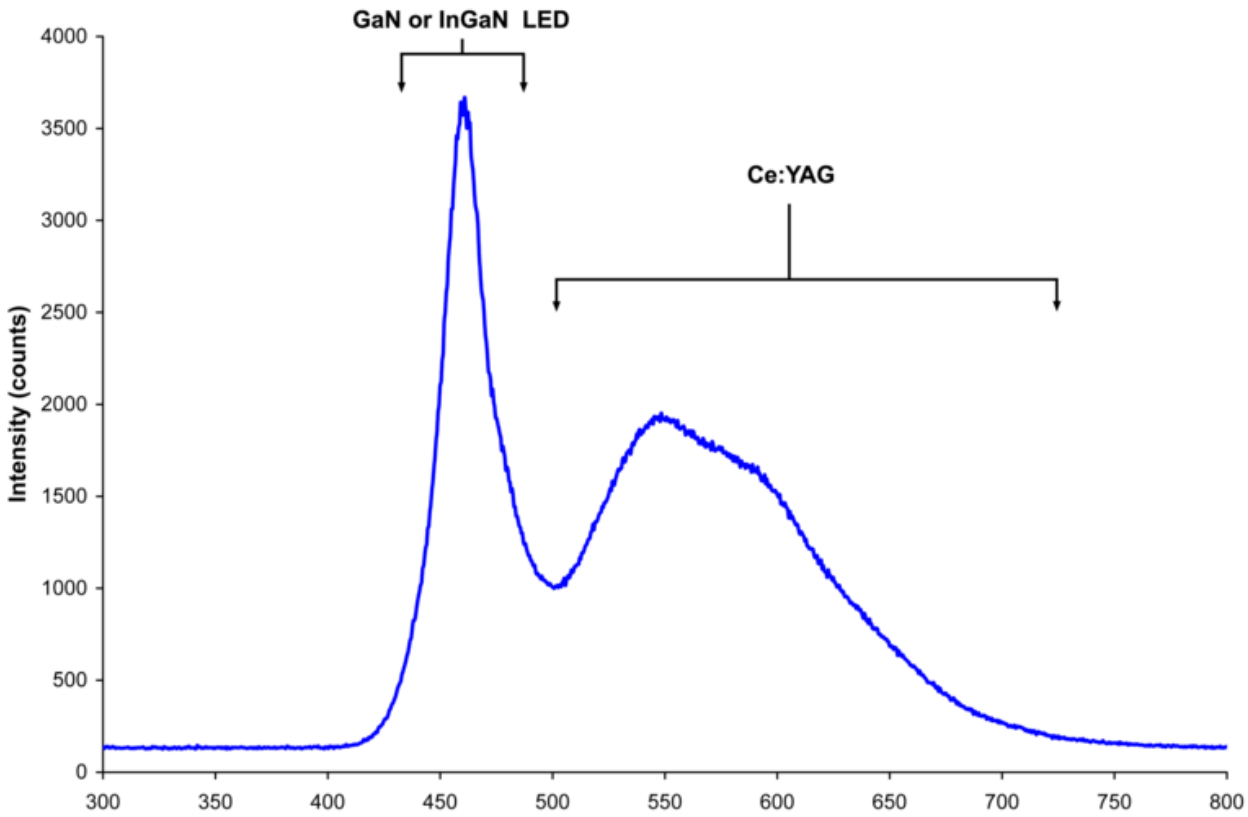
- LED Technology review
- Wook's lights
- Light review
- Issues arising

# What is this talk about?

- LED Technology review
- Wook's lights
- Light review
- Issues arising

# LED Technology

- Indium-gallium-nitride blue LED with phosphor
- cerium-doped yttrium aluminium garnet (Ce3+:YAG)



# LED History

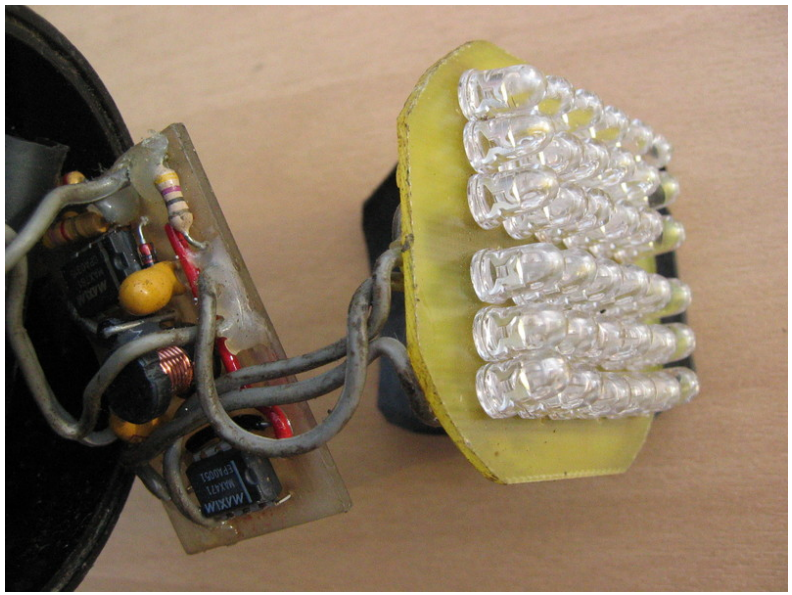
- 1996 1st Nichia 3mm/5mm LEDs. 7.5 lm/W @20mA
- 1999 Lumileds produced 1W die. 15 lm/W @350mA
- 2003 Lumileds Luxeon 5W. 18-22 lm/W @1A
- 2004 Luxeon 3W. 35 lm/W @ 350mA
- 2006 Cree XRE/SSC P4 60-80 lm/W @350mA
- Prototypes now at 150lm/W @20mA

# LED efficiency


Mutter - hold on a mo. . .

# Wook's Lights

# France Light

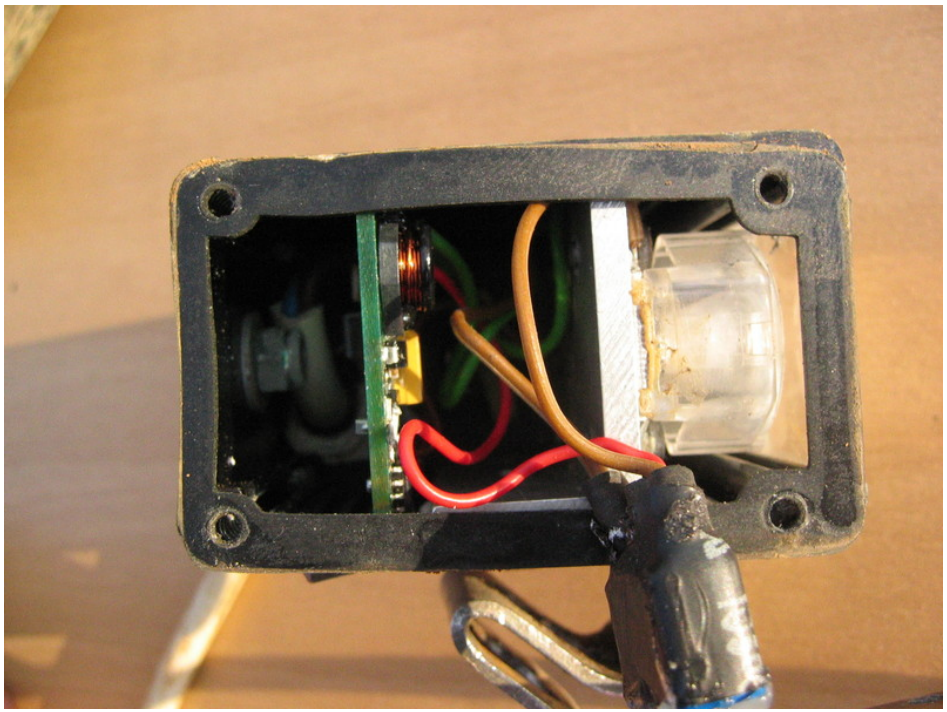


- Matched array. Resistor low-beam.
- 2.8W 36 LED full beam. 0.1W pilot.
- £70 + batts
- Mulu, China, 3-days caving (3 x 18650 cells)
- Some have now done > 1000hrs

# Solid Light - mk1


- Modified bike light
- Luxeon 3W, 20 degree optic
- PIC. Up to 6 levels - settable via SDK
- dodgy-cable-proof. Nice control, low-batt fallback
- £60

# Solid Light - mk2



- SSC P4 x2
- 10 degree and 20 degree optics
- 0.06W, 1W, 4W
- min-power start
- £16

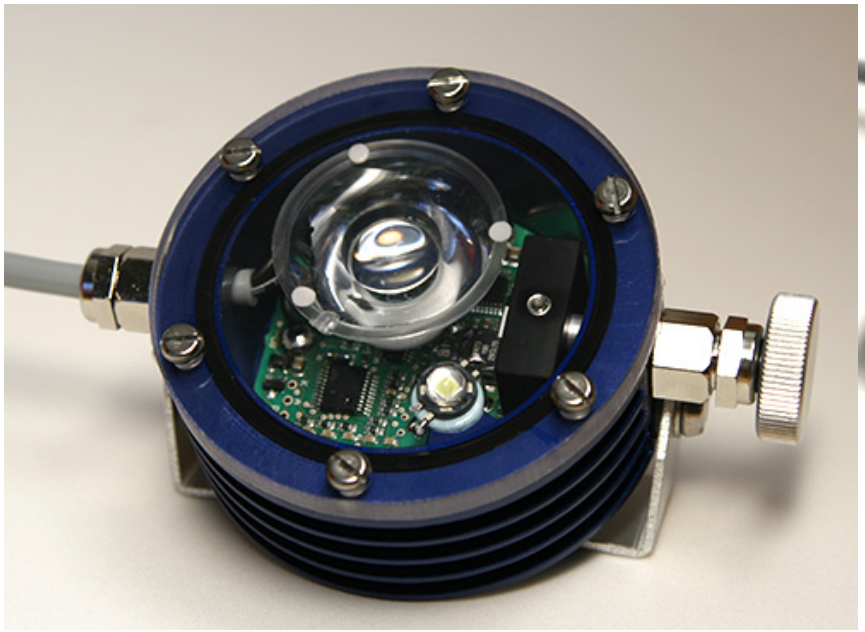
# Actionlight

- HDS systems - First Nichia array

# Nova5

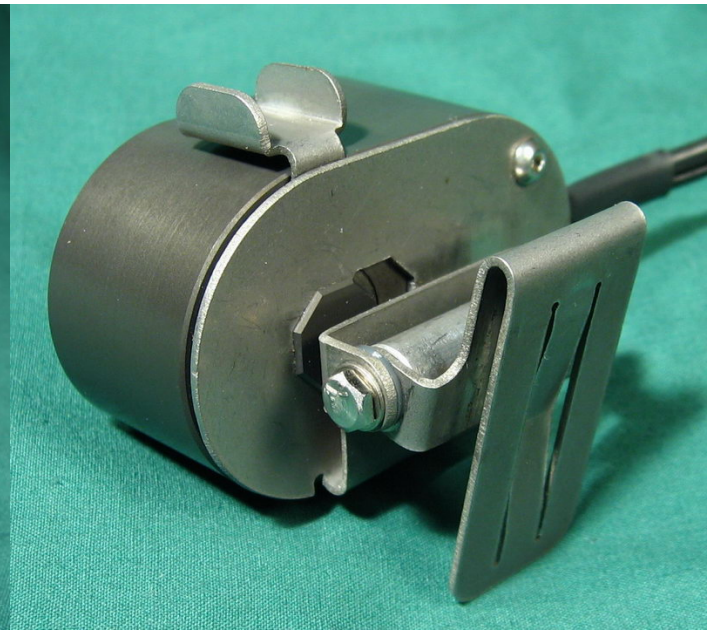

- First (only?) 5W Luxeon light
- 5 levels
- 6mA standby!
- 50m waterproof, magnetic flex-switch
- £100

# Scurion



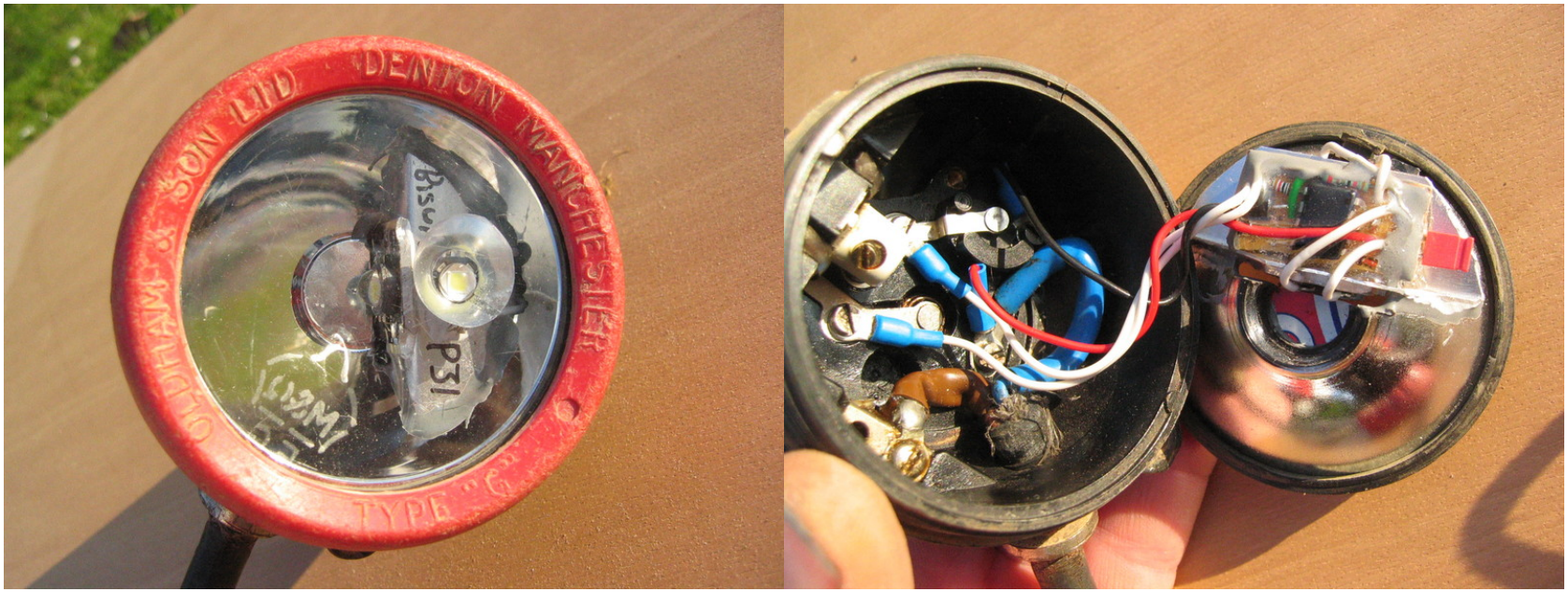
- SSC P4 x 2, 6 degree and 180 degree + UV LED
- up to 10 settings, 4 levels per LED, independent.
- charge indicator, transport lock, programmable, waterproof
- 5.1Ah 7.2V Li-ion. 8h @250lm, 24h @100lm, 70h, > 250h
- £147 (£278 inc batt, case, charger)

# Stenlight

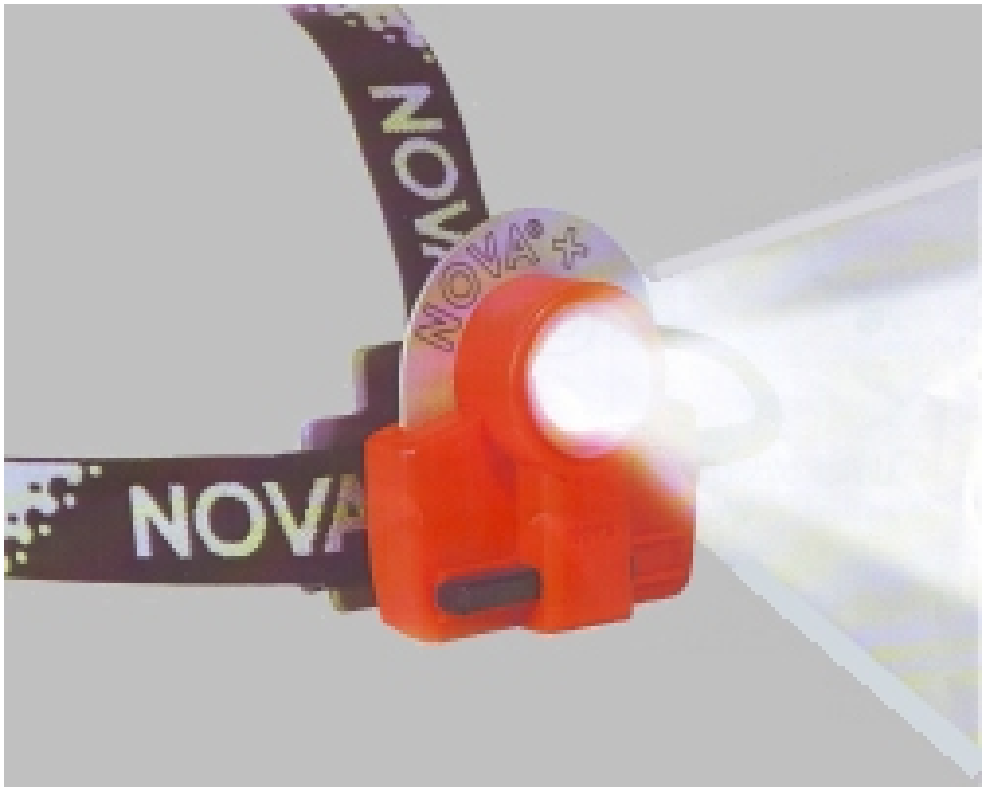
- Luxeon 3W x2, 5 and 15 degree optics (25,50 options)
- 4 levels. 7W (2hrs 140lm), 2W (7hrs 45lm), 0.6W (>24hrs 12lm), 0.1W (>3 days 3lm)
- 7.5m waterproof, magnetic switch, no CPU. 6-18V batt.
- £148 (£200 light+batt)

# Bisun




- 2x SSC P4, one v. pointy, one  50 degrees
- 2 or 3 levels per led, (1W, 0.3W, 0.1W), independent
- 3.6-5.5V batts. Lion, 3x niMH or alkaline
- dodgy-cable-proofing. low-batt warning removed
- £75 (P31) £50 (M31)

# Nova Plus




- Luxeon 3W
- £85

# Retro2


- SSC P4 1W x2
- 1-7V batt (2-6V useful)
- 4 levels: 2W (200lm), 1.5W (150lm), 1W (100lm), 0.3W (30lm)
- Overheat fallback, low batt warning (jumper for batt type)
- £75

# Princeton Apex

- Luxeon 3W + 4 5mm LEDs
- Light, small, neat engineering
- Annoying switch, not waterproof
- £50

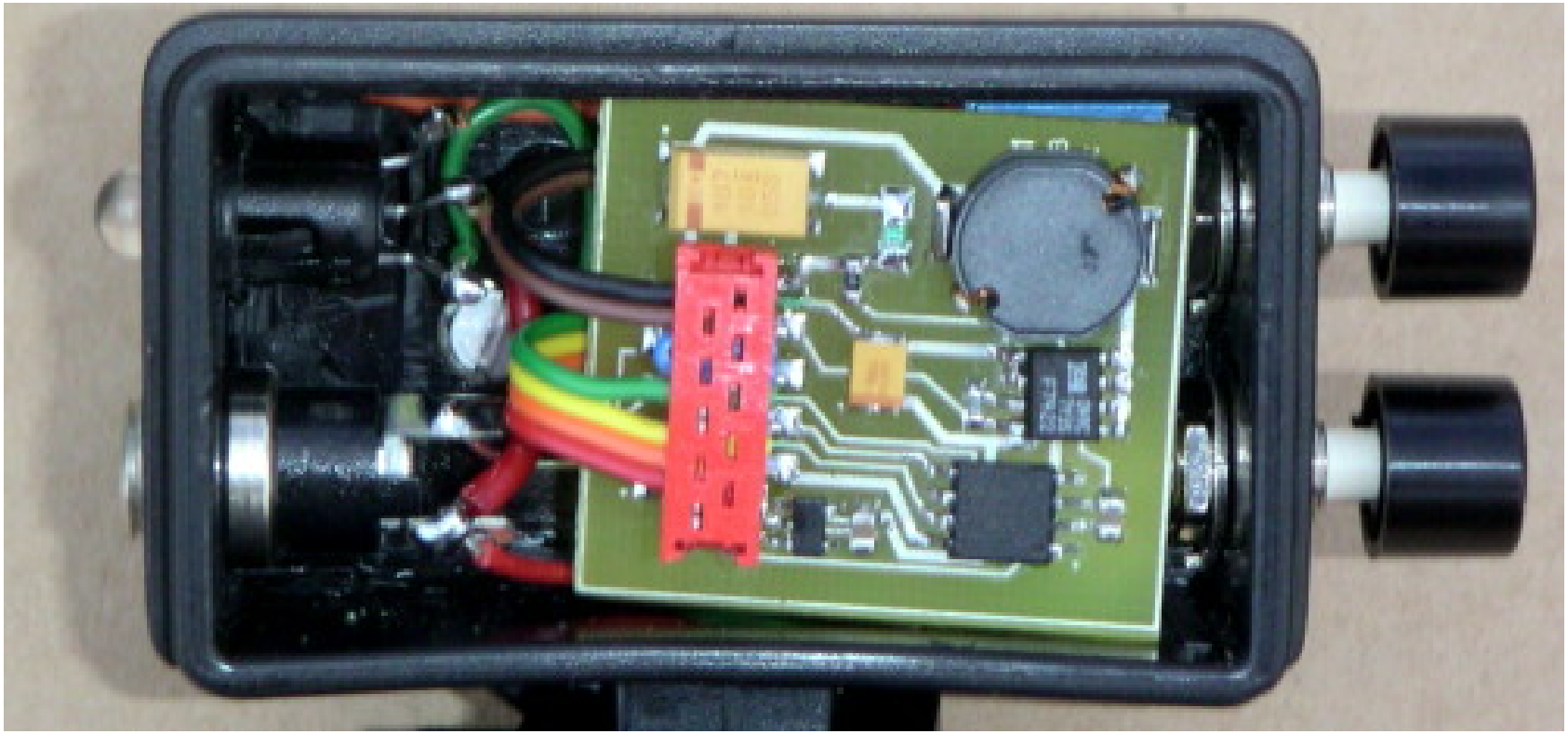
# Others

- Petzl Myo
- Speleotechnics Leds
- Gerber
- Various things off ebay
- ledcavinglight

# CUCC light

- Luxeon 3W
- Resistor control - 2 levels 1.6W, 0.3W
- 3 or 4 NiMH
- 20 degree optic
- £25, (£50ish inc batt)

# AT-Tiny



- Published hardware design.
- Resistor control - 2 levels 1.6W, 0.3W
- 3 or 4 NiMH
- 20 degree optic

# DIY

- SSC P4 x2 with 5 degree + wide
- 18670 Lion cell/3xNiMH AA or 18650
- Driver (bflex/buckpuck/solidlights/ATtiny)
- Zoom box
- Ali box or Oldham

State-of-the-art light for about GBP 100

# Summary

| | LEDs | Beams | Set | Lumens | Housing |
|---|---|---|---|---|---|
| Scurion | 2x P4 i | 6,180 | 10 | 4:250,100,?,? | Ali |
| Stenlight | 2x Lux t | 5,15 | 4 | 4:140,70,45,12,3 | Ali |
| SolidL | 2x P4 i | 10,20 | 6 | 4:270,70,5 | Ali |
| Bisun | 2x P4 i | 3,50 | 2/3 | 2: | Ali |

# Batteries

- Potted. Heavy.
- Bungee is good
- zoom box, ali former. Brass contact bar.
- Self-amalgamating good for 3-5 yrs
- 18650/18670 or AA NiMH or Lion.
- Discuss. . .

# Conclusions

- LEDs are great! Especially on expedition
- We have plenty of choice
- Doesn't have to be expensive
- Pointy + wide is best
- Pointy should be  5 degrees
- Wide - whatever you like

# Issues

- Radio Interference - Nova5 - any others?
- Reliability - batt cables, even on scurion, stenlight
- Stenlight switch jamming, scurion batt case issues
- Nova not popular?
- Oldhams poor heatsinks
- Mine exploreres and expedition cavers differ
- Smaller, lighter, more reliable

# Comments

- What's yours - is it any good?