MILITARY VEHICLE
LED AND IR LIGHTING

IR Driving and Tail and Brake Lights

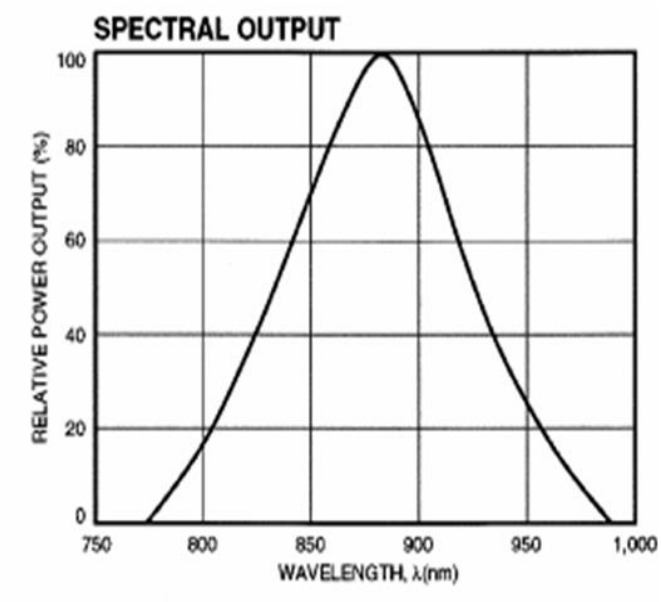
Front driver in 12 and 24V
- STANAG 4381 compliant
- Nato Stock numbered

Rear IR Tail and Brake light in service
- STANAG 4381 compliant
- Nato Stock numbered
- 12V & 24V Land and Marine Versions

IR Driving and Tail and Brake Lights

- IR Driving lights when used under very low ambient light conditions, augment the NVG Driver and enable much safer and faster driving speeds.

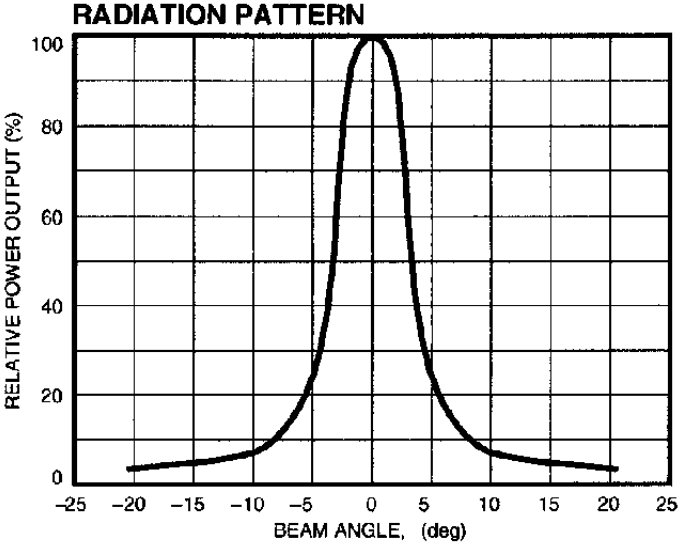
- IR Lights are set at the optimised wavelength level 800nm optimised for best performance for use as a Headlight in the spectrum with Lucie NVG's.



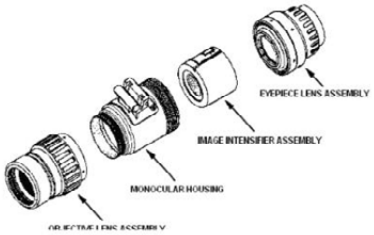
IR Driving and Tail and Brake Lights

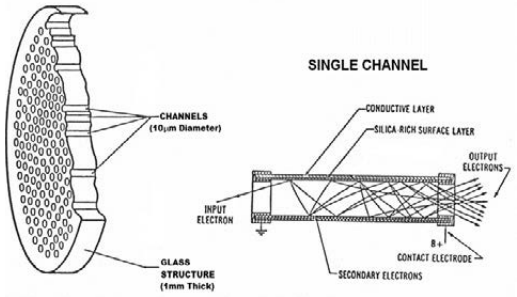
- By providing a focused beam angle of +-6% this reduces the forward light profile for a more discrete driving light beam shape and improving visibility for identifying obstacles.

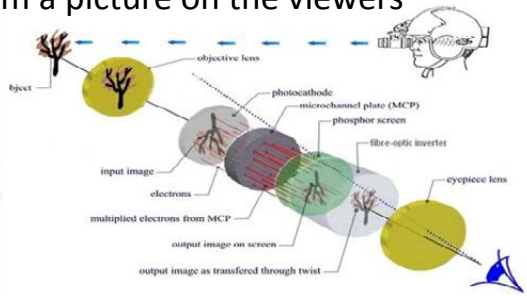
- The beam extends approx 75m depending on the ambient conditions without compromising the Goggle performance whilst allowing improved driving speeds



NVG's use an Image Intensifier.
They work because of a Microchannel plate made of special material that can convert each IR electron of light entering the optic to form a picture on the viewers eyepiece.

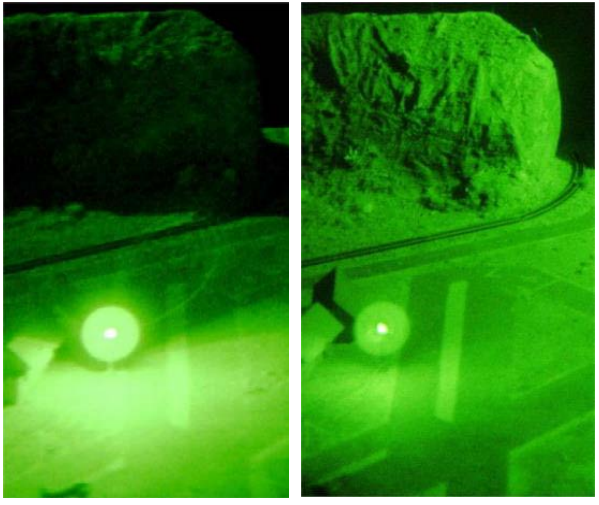






If too much IR from the environment and/or the driving lights reflects back on the NVG objective lens it can cause poor imaging, "shadowing" on the periphery and worse case "Blooming".

IR HEadlights have been optimised when used in low ambient light conditions for beam intesity, wavelength and strength not to overpower NVGs cause "shado-wing" for peripheral vision whilst allowing a driver to see a practical distance ahead (50-75 m depending on light conditions) for driving safely at speed.



- They can be retro fitted to current vehicles in service
- They can be reused on new vehicle designs providing saving funds for future vehicles
- They have a long life of 50,000 MTBF and are robustly built sealed to IP67
- There is a Safety Case for using 2 rear IR combined convoy and brake lights makes driving at speed in convoy safer
- Already in use on some platforms of the British Army: Jacckal and Jackal II, Husky, Cougar, Mastiff, ATV quads, Yamaha Bikes
- Used on US, French, Dutch, German Nato force vehicles

Interior LED NVG Friendly Lights

Interior LED NVG Friendly Lights

- They use very low power
- They can bemulti function with ability to switch to other colours.
- They are NVG Friendly so do not interfere with NVGs
- The light intensity can be adjusted
- They are electronic so wlll emit unwanted emission if not built correctly so need to designed for EMC
- They are power protected against Load Dumps
- They can be used in all harsh conditions and are reliable
- They have a very long MBTF life so operationally they are Fit -and-Forget

BETALIGHT
when reliability really counts

Interior NVG Friendly/NVIS Dual mode LED DC Combi Light

Meets/Exceeds all Military Standards
- EMC DEF Stan 59-411 Land Service class A & B
- DEF-STAN 61-5 PART 6 ISSUE 5 & 6
- MIL-STD-461

Power
- Low energy usage DC13-32v, No heat. 25W output equiv.

Performance Lighting
- No maintenance, and a very long life 50,000 hours MTBF or 5,7 years continuous use.

Programmable, Dimmable Lighting, NVG Friendly
- Normal white, 0-1100 lms in LED White, can be reset to lower levels
- Tactical Red, Blue, Green, NVIS White options
- Low profile and lightweight 300g.
- Tough Construction, High Vibration, and Shock tested
- DC IP67 sealed

Reliable in Extreme Temps. -46~C to + 71~C
- Instant start-up at low temperatures (below -20C)

Safety Compliance for Photobiological Standards and Regulations for LED Components IEC/EN62471 Safety Compliance for Photobiological Standards and Regulations for LED Components IEC/EN62471

BETALIGHT

when reliability really counts

DC Combi Technology Matrix

Series	1	2	2a	3	3a	3b	3c
Drawing Number	CP40357	CP46441 supercedes CP42005		CP40688	CP44596	CP44867	CP46442
DEF-STAN 59-411 Land Class A	x						
DEF-STAN 59-411 Land Class B	x			x	x	x	x
DEF-STAN DEF-STAN 61-5 PART 6 ISSUE 5	x	x	x	x	x	x	x
DEF-STAN DEF-STAN 61-5 PART 6 ISSUE 6				x	x	x	x
MIL-STAN 1275*	x	x	x	x	x	x	x
MIL-STD-461E	x	x	x	x	x	x	x
INPUT VOLTAGE	12-32V DC. (OVERVOLTAGE 36V FOR 1 HOUR)	13-32V DC. (OVERVOLTAGE 36V FOR 1 HOUR)					
MAX POWER CONSUMPTION	25W	16W	16W	30W	30W	30W	30W
SEALING: IP67	x	x	x	x	x	x	x
Primary Colour LED	White	White	White	White	White	NVIS WHITE MIL-STD-3009	WHITE
Second option Colour LED	Factory set RGB	Customer programmable RGB		Red	NVIS WHITE MIL-STD-3009		Factory set RGB
Dimming Control Signal	Discrete +- signal	Discrete +- signal	Discrete +- signal	Discrete +- signal	PWM	PWM	PWM
Dimming on unit option	x	x	x	x		x	x
Dimming Externally controlled option	x				x	x	x
				x	x		x
Lumens Le⍰el Max	1100	Special setting 500	Special setting 501	1100	1100	1100	1100
MTBF	50⍰000-6⍰000rs						
OPERATING TEMPERATURE RANGE:	:-40⍰CTO 50⍰C.			-46⍰C to +71⍰C			
Connection	Flying lead	Flying lead and connector	Flying lead and connector	38999	38999	38999	38999
Weight	350g	375g	375g	470g MAX	470g MAX	470g MAX	470g MAX
Height	18mm	21mm	21mm	27mm	27mm	27mm	27mm
NATO STOC⍰ CODE	(NSN) : 6220 99 993 1163						
Special ⍰eature		customer programmable tactical colour, door input, ignition input		Forced mode - White light at 300 lux			Forced mode
Mar⍰		E11	E11				

* E⍰ui⍰alency claim to DEF STAN 61-5

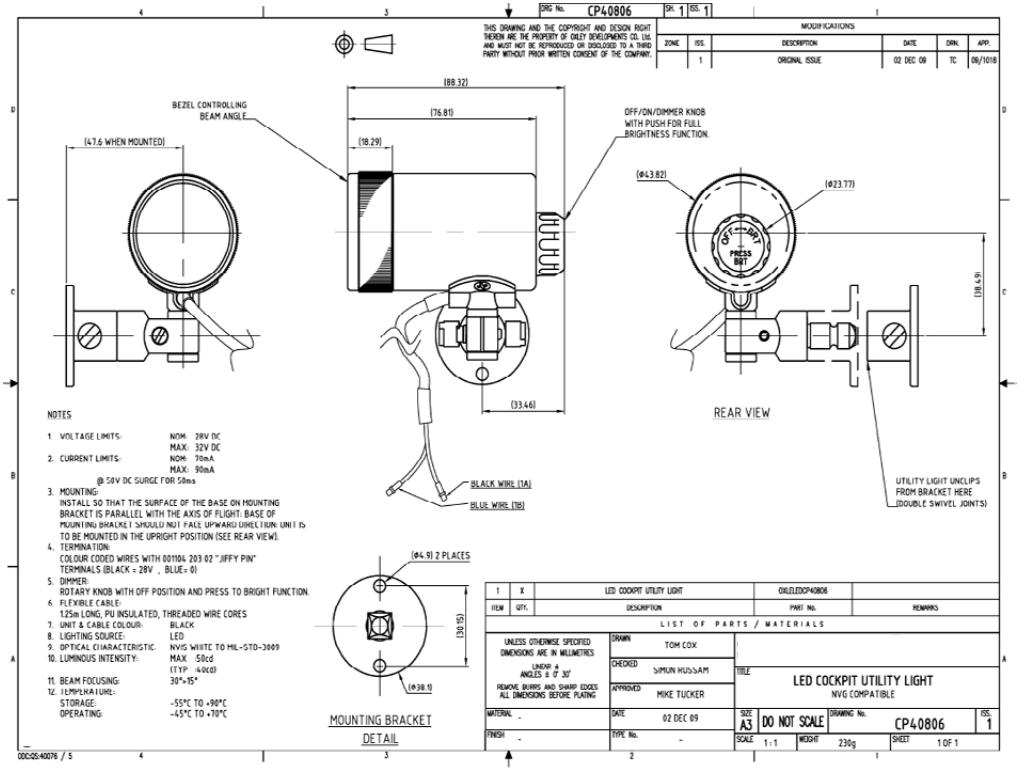
BETALIGHT
when reliability really counts

Shelter AC LED Lights with Emergency & Tactical

- Low energy usages DC 12-32v and AC 90-230 Universal input
- No Maintenance, long life
- Operational fit-for-purpose. 3-in-one programmable, dimmable Lighting
    - Normal 1800 Lumen
    - Tactical Red, Blue, White
    - Emergency Battery back up 1 hour

- Excellent space envelop, Low profile
- Tough construction, high vibration and shock tested to 50g.
- IP 67 sealed
- Dimmable and programmable
- EMC Def Stan 59-411 Land Service class A & B
- Reliable in Extreme Temps and Harsh Environments
- Lightweight
- Instant start-up at low temperatures (below -20C)

NVIS/Non NVIS Utility Light with mounting



NVG Compatible and Friendly LED Map Lights

Other External NVG Friendly Lights

360 ° IR and Trimode Flashing Beacons fitted to French SF

LED Search and Spotlights

- High Intensity 325,000cd
- Power Consumption 115W max
- Low Weight - Spotlight 2.2 kg / Tripod 3.5kg
- Extreme Operating Temperature
  -46 ° to + 55°C
- Colour - Aviation White 6000K
- Aluminium housing,
  matt black anodised finish (light)
- Long Life MTBF in excess of 50,000 hrs.
- Output: 5.5° ± 1° from optical axis
  to 10% max
- Input voltage 18-32.2 VDC (28VDC nominal)

Multiple angle Spot/Flood

OPTICAL PROPERTIES				
ITEM #	cd/lm	FWHM (°)	FW10% (°)	DESCRIPTION
/01	152000*	8*	12*	SPOT
/02	69600*	10*	18*	NARROW
/03	15200*	29*	42*	MEDIUM
/04	11800*	33*	46*	WIDE
/05	5600*	45*	60*	VERY WIDE
/06	19000*	54H+9V*	74H+20V*	OVAL
				* - TO BE CONFIRMED

- Low Power Consumption 55W
- Low Weight - 1.4 kg typ
- Operating Temperature -40° to + 71°C
- Colour - White 6000K typ
- Aluminium Housing, matt black anodised finish
- Bracket, handle and retainers - stainless steel 316 grade
- Lens - toughened borosilicate glass
- Mean Time between Failure in excess of 30,000 hrs.
- Environmental Qualification to MIL-STD-810G
- EMC Qualification to MIL-STD-461F
- Input voltage 18-32.2 VDC (28VDC nominal) in accordance with MIL-STD-1275D

Full Compliance to Military EMC and Power specifications

Products are build to the latest EMC and power protection standards

- Protected against extreme Load dumps - Protecting all equipment inside from power surges up to 220V due to Load dump

- All products are designed for extremes - Operators want longer life and high reliability in extreme climates and environments

- NVIS and NVG Friendly design

- LED Technologies and clever designs help to ensure the platform is fit for purpose far into the future

UK DEF-STAN to MIL-STD Comparison

- MIL-STD 461 for EMC is the equivalent of DEF-STAN59-411
- MIL-STD 1275 for power input is the equivalent of DEF-STAN 61-5
- The standards are different so the comparison is not straight forward but it is a fair statement to say that DEF-STAN 59-411 Land Class B or A and the DEF-STAN 61-5 tests are more stringent than the MIL-STD tests.

The vehicle lighting has been designed to meet both MIL-STD requirements and UK MOD DEF-STAN requirements

UK DEF-STAN 59-411 Land Class A and B

UK Ministry of Denfence Standards 59-411 Part 3:

Class A Limits

These are the most stringent limits applying to equipment which must operate at a distance of less than 2 m from the nearest RF antenna.

Class B Limits

Internal equipment in a protected screened vehicle (e.g. metal hulled vehicle) can use the less demanding bearing in mind that the screening effect is reduced temporarily for operational reasons (such as opening a hatch, window or door)

We use a combination of filtering and shielding, such as the improved bonding technics to attain this level.

DEF STAN 61-5 Part 6 issue 5 and issue 6

When you have a heavily loaded electrical system you riks 'Load Dump'.
If there is a large surge voltage you may have to reboot or turn the system off but may not be or want the system to shut down completely. This is defined in standards ISO 7637-2.

UK MoD Voltage Protection standards

Part 6, Issue 5 limits:
This protects up to 90V surge for 28V vehicle power system architecture used in UK military vehicles. Issue 5 does not cater for 12V systems.

Part 6, Issue 6 limits:
The standard defined in DEF STAN 61-5 Part 6, Issue 6 protects up to 212V surge. (2.5 times higher!)

Protection has created on the devices against LOAD Dumpes through a design configured to **fully operate throughout** such surges, meaning the light stays on at all times so no need to switch off in this surge period

The End User gets performance and protection, high reliability and operational capability

BETALIGHT
when reliability really counts

Compliance

Test Description	Specification Section	Category / Severity / Procedure	QTP Test Ref	Statement of Compliance
Temperature Shock – Shock from constant extreme Temperatures	MIL-STD-810G Method 503.5	Procedure I-C	5.1	COMPLIANT
Low Temperature Operational	MIL-STD-810G Method 502.5	Procedure II	5.2	COMPLIANT
High Temperature Operational	MIL-STD-810G Method 501.5	Procedure II	5.3	COMPLIANT
Humidity	MIL-STD-810G Method 507.5	N/A	5.4	COMPLIANT
Damp Heat Steady State (DHSS)	BSEN 60068-2-78:2001	Test Cab (21 Day)	5.5	COMPLIANT
Functional Shock	MIL-STD-810G Method 507.5	Proc I	5.6	COMPLIANT
Shock (Bench Handling)	MIL-STD-810G Method 516.6	Proc VI	5.7	COMPLIANT
Random Vibration	MIL-STD-810G Method 514.6	Curve C-3 (modified)	5.8	COMPLIANT
Salt Fog	MIL-STD-810G Method 509.5	N/A	5.9	COMPLIANT
Water Ingress to IP67	N/A	IP/7	5.10	COMPLIANT
Optical Testing	N/A	N/A	6	COMPLIANT

Compliance

EMC –C onducted Emissions	**DEF STAN 59-411 Pt 3 MIL-STD-461E**	**DCE01.B DCE02.B CE102**	**7.3.1.1C**	COMPLIANT
EMC -R adiated Emissions Electric Field	DEF STAN 59-411 Pt 3 MIL-STD-461E	DRE01.B RE102-4	7.3.2.1	COMPLIANT
EMC -R adiated Emissions Electric Field Tuned Antenna	DEF STAN 59-411 Pt 3	DRE03.B7	7.3.2.2	COMPLIANT
EMC -R adiated Emissions Magnetic Field	MIL-STD-461E	RE101	7.3.2.3	COMPLIANT
EMC -P ower Input	DEF STAN 61-5 Pt 6 Iss 5 and Iss 6	28V DC Systems	7.3.2.4	COMPLIANT
EMC -C onducted Susceptibility	MIL-STD-461EC	S114 CS115 CS116	7.3.2.5	COMPLIANT
EMC -R adiated Susceptibility Electric Field	MIL-STD-461ER	S103 (200V/m) RS103(50/V/m)	7.3.2.6	COMPLIANT
EMC -R adiated Susceptibility Magnetic Field	MIL-STD-461ER	S101	7.3.2.7	COMPLIANT
EMC –E SD	DEF STAN 59-411D	CS10	7.3.2.8	COMPLIANT

High reliability EMI Filters

- Single line filters
- Multi line filters
- Filter array
- Filtered connectors
- Planar capacitor array
- Transient voltage suppression

Applications

- Aerospace
- Vehicles
- Communications
- Missiles

Interconnect

- Smox
- Kinky pins
- SNALE
- Snaplox
- Plugs & Sockets

Applications

- Aerospace
- Vehicles
- Communications
- Missiles
- Railes
- Industry

BETALIGHT
when reliability really counts

Highly Reliability Lamps

- Panel sealed indicators
- Sub-miniature lamps
- Rear mounting lamps
- Segmented lamps
- Bulb replacements

Applications

- Aerospace
- Vehicles
- Communications
- Missiles

Land Platforms

425+ GD FP UK Foxhound

589 AJAX GD UK

389 WCSP Warrior UK
Lockheaed Martin

331 BAE Hagglunds BSV10 Sweden
Sweden/Norway/Austria/Holland

Thales Hawkei Australia

800+ Jackal UK - Supacat

BAE Viking/BV206 UK

KMW Dingo 2

7000+ Cougar/Mastiff MRAP for US/UK

100's of Mercedes
G-Wagon command and control Modules - Australia

100's of ATV's UK

Eagle IV GD ELS

Land Platforms

GD LS Canada

ARQUUS (RTD (Renault Defence)), France

RMMV MAN

CMI BELGIUM - TURRETS

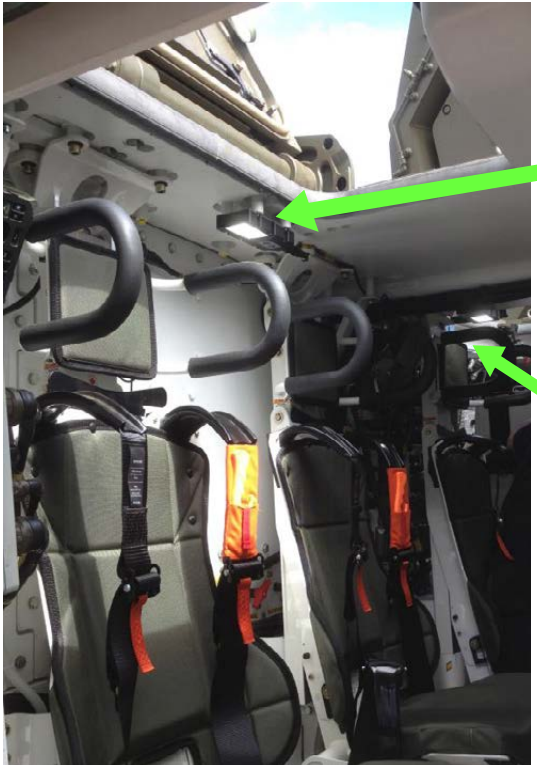
Pearson Engineering UK - Mine Clearance

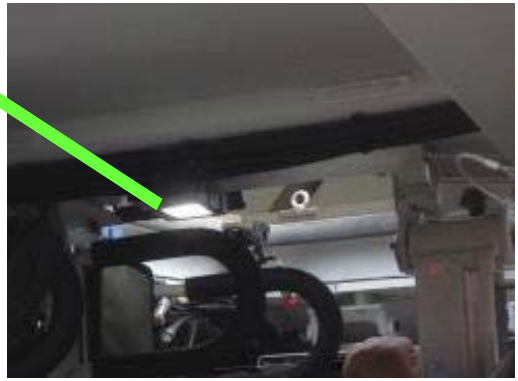
British Army IR light fitted to 800+ Jackal, jackal 2 and Coyote for UK SF

KMW UK BOXER

GD UK Ajax

GD UK Ajax





DC Combi - GD Force Protection Europe - Foxhound

DC Combi - Light Fitted to RMMV MAN Military Truck

WCSP - Warrior

The lighting system now selected by lockheed Martin for WCSP modernization


land
IR Beacon Light
DC Combi Light
LED Mini Floodlights
NVG Compatible Filters / Modifications
IR Floodlight
Dual Mode LED Bulb Replacement
IR Brake / Convoy Light
IR Driving Light
LED Lamps / Indicators
LED Gooseneck Light
Telecomms EMC Filters
Etag Asset Management
Vehicle Scope of Supply

BETALIGHT
when reliability really counts

Lighting systems for Air and Sea Platforms

Aircraft

- KFX
- Gripen
- Tornado
- C-130
- C17
- Sokol W3P
- Blackhawk
- MI2,8,17,24 Helicopter
- F-5, F-14, F-15, F-16, F-111
- CH-47 Chinook
- Gulfstream
- KC-46
- Lynx

Sea Programmes

- Type 45 Destroyers
- QEC Aircraft
- A19 Gotland Class Submarines
- A26 Submarine
- Australian Collins-Class
- Singapore OPV's
- Australian Training
- Canadian Frigates

Betalight B.V.

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