



Defence Materiel Organisation
Ministry of Defence



E-Lighter®

Realizing a diesel
powered solution for
the battery burden



Contents

Customers perspective:

- Energy challenge with soldier modernization
- The Dutch approach
- Considered solutions



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E-Lighter[®] solution by Fokker:

- Fokker technologies
- Realising a solution: the E-Lighter[®]



Working together for a successful solution:

- Taking the time required to mature the technology
- Involving end users in the E-Lighter[®] product development



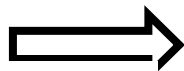
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Energy challenge with soldier modernization:

Operational Need
e.g. SA



Electrical equipment providing
needed capabilities



Energy
=> Batteries



**Up to and over 10 Kg
per soldier!**








Energy challenge with soldier modernization: The Dutch approach

1. Ensure that electronic equipment is energy efficient:
LOW POWER!
Can reduce up to 50% of battery weight
2. Standardization; reducing different types of batteries
Spares can be shared;
Easier to implement new and lighter batteries
3. Weight efficient power sources:
Technologies providing the energy (Wh) at the lowest weight (Kg)
Without increasing logistic footprint!
(Single fuel concept)




Considered solutions

	Weight	Logistics	Remarks
Li-Ion 	±	+	Rechargeable
Zn-Air 	+	-	Non-rechargeable
PV 	+	+	Only for stationary usage/applications
Fuel Cells 	+	-	Additional fuel logistics
E-Lighter [®] (2015) 	+	+	Runs on logistic diesel fuel




E-Lighter[®] weight performance (indicative)

Action of ½ week; Air Assault Brigade; Squad

Equipment	Battery Weight	E-Lighter Weight
2x 	24 kg	11 kg
Weight savings	13 kg	56%

Action of ½ week; Royal Marines; Squad

Equipment	Battery Weight	E-Lighter Weight
4x 	53 kg	21 kg
Weight savings	31 kg	59%



E-Lighter® - Contract

September 2011:

Contract awarded by the NLD MoD to Fokker Aerostructures for the final development of the E-Lighter® towards a proven product, with a procurement option for serial production



E-Lighter[®] solution by Fokker

August 2015



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Fokker Aerostructures

Strong and innovative partner in Defense, both aircrafts and land based systems



Realizing a solution: the E-Lighter®

Product overview

- Power source for dismounted soldier
- Delivers 15 Watt @ 8-18 V
- Fuel: Diesel (JP8 is possible)
- SMBus-protocol
- Operates in every orientation
- Simple to operate (on/off)
- Safe
- Easy refueling



Realizing a solution: the E-Lighter®

Product overview (2)

- **Dry weight** 1.1 kg
- **Weight for 48 hours** 2.5 kg
- **Volume** 1.7 l (without refuel bags)
- **Environment** Full MIL-STD-810, climate categories A1-C1
- **Noise** Non detectable at 10 m
- **IR** Low
- **Water immersion** Resistant



Realizing a solution: the E-Lighter® E-Lighter® kit



Realizing a solution: the E-Lighter®

Expected use

Powering equipment or charging batteries

Low power



E-Lighter as squad charger.
On or multiple E-Lighters per squad.

High power



E-Lighter as personal charger/power source; one E-Lighter per person.

Realizing a solution: the E-Lighter®

Strong point 1: Weight performance

Energy	Runtime @ 15W _{av}	Weight E-Lighter	weight Battery (180Wh/Kg @2015)
180 Wh	12 h	1,3 Kg	1 Kg
360 Wh	24 h	1,6 Kg	2 Kg
720 Wh	48 h	2,2 Kg	4 Kg
1080 Wh	72 h	2,8 Kg	6 Kg

E-Lighter operationally interesting when carrying more than 2 kg of (spare) batteries

Realizing a solution: the E-Lighter®

Strong point 2: Simplifying logistics

Fits easily within military logistic supply chain

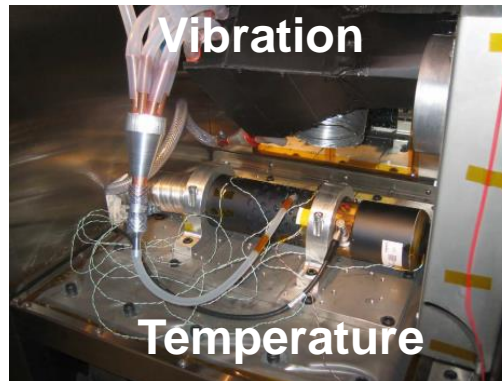
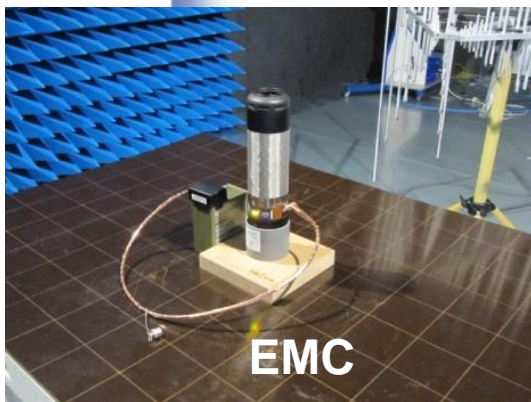
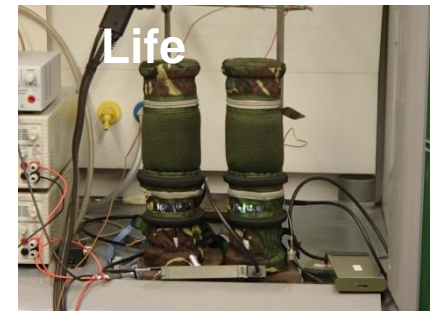
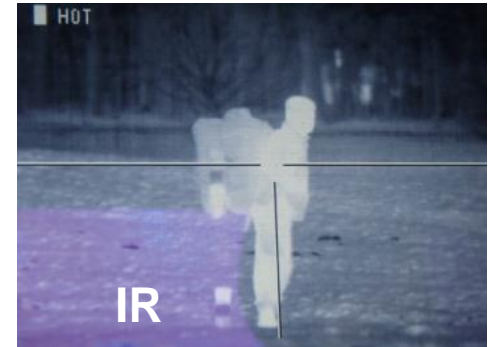
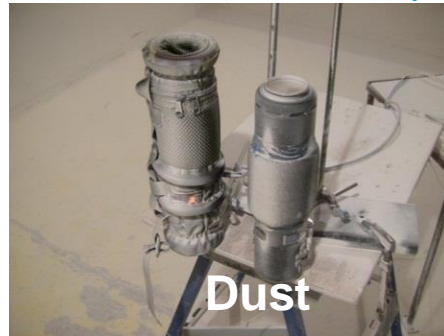


But, if necessary, can also function without one





TRL 7/8 qualification and field tests



Working together for a successful solution





Involving end users in the E-Lighter product development





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Questions?

