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The European
Security and Defence Union

"Where does Europe go from here, President Juncker?"

For the EU 2015 could be a major turning point, but there is no time to lose: it is now or never.

SMART ENERGY

Thinking through the energy change:
smart energy becomes a reality in security and defence

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Installing reliable electrical infrastructure quickly in any location

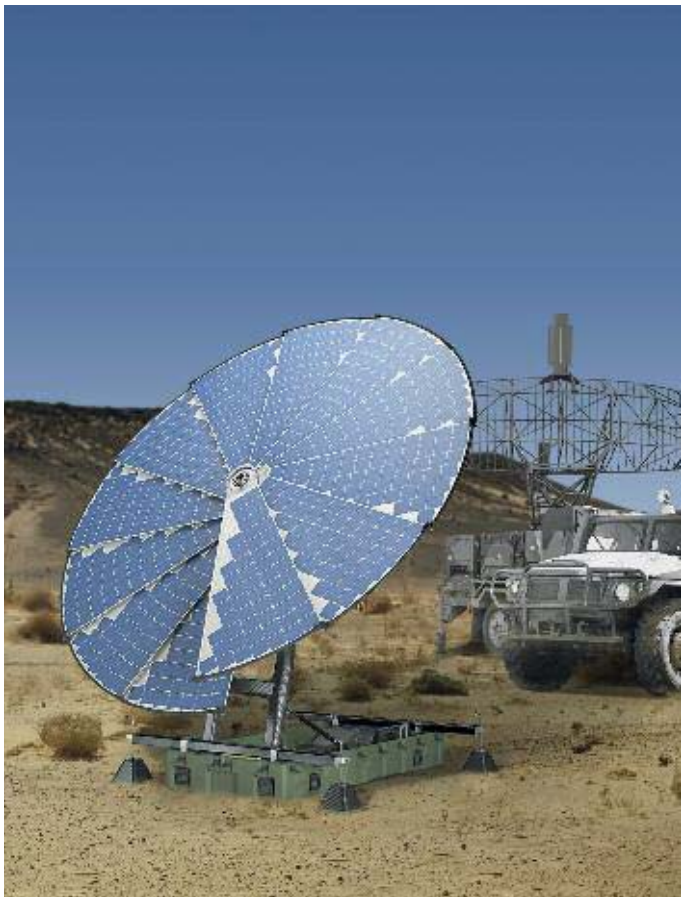
Photovoltaic power available in a flash

by Nannette Cazaubon, Journalist, Paris

The priority in the event of any disaster is to act fast to provide assistance and save lives: essential for that are not only trained civilian or military personnel and motivated aid organisation staff but also food and medicine and – above all – electricity. Whether in the wake of an earthquake, a nuclear power plant incident or a conflict, a secure power supply is a prerequisite for a range of functions that are vital for the work of civilian and military personnel, from keeping communication channels open to operating medical facilities such as field hospitals.

Stand-alone energy systems

How electricity is produced for a given site will depend not least of all on the location and type of terrain to which personnel are deployed. In remote areas with no infrastructure, or where the infrastructure has been destroyed by an earthquake or fighting, installing the usual diesel generator-based mobile power supply systems poses a problem if the transport routes for bringing in fuel no longer exist or need to be built from scratch, which is time-consuming.



The mobile photovoltaic system REMULES requires no external power input

Photo: © smartflower energy technology GmbH

Photo: private

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Mobile photovoltaic systems can fill a gap here. They are constantly being developed and adapted for use by civilian and military personnel in crisis zones. To meet the challenge of setting up reliable electrical infrastructure as quickly as possible wherever it is needed, mobile photovoltaic systems need to be easily transportable (including by airdrop) and able to function in extreme conditions such as mountainous terrain (snow and ice), desert regions (sand, dust) and coastal areas (salt in the air). To fulfil those requirements concepts making use of new materials and processes need to be developed.

REMULES: ultra light and highly mobile

This is why the innovative system REMULES (REnewable Mobile Ultra Light Energy System) has been designed. This ultra-light, highly mobile photovoltaic system requires no external power input, since it operates self-sufficiently, is quick and easy to transport and functions in a range of operational scenarios.

The system was developed by the Austrian company smartflower energy technology GmbH[1], developer a few years ago of the world's first all-in-one photovoltaic system that is delivered directly to the client and can be set up and running within the hour.

The REMULES system combines aeronautical techniques with photovoltaics using a novel PV technology, modules without any glass sheets and extremely lightweight semi-flexible foil laminates. With a net system weight of 190 kg, the plug-and-play system can be set up in just 10 minutes. It includes all the necessary components and has separate battery units to ensure the direct availability of electrical power. It can operate 100% stand-alone or in co-generation with other generators. In view of these characteristics REMULES will be playing an

important role in the NATO Capable Logistician 2015 (CL 15) exercise being organised in June 2015 in Hungary as part of the "Smart Energy Camp" where, among other things, it will supply electricity to the PFISTERER Mobile Power Supply System (PMPS).

1 Supported by the Austrian Ministry of National Defence and Sport, the Red Cross, the Johanniter organization, and the Austrian Institute of Technology, as part of KIRAS, a national security programme, owned by the Austrian Ministry for Transport, Innovation and Technology and the Austrian Research Promotion Agency.

Technical Specifications:

Composition

- Constructed entirely from carbon fiber
- Combines aeronautic and photovoltaic technologies
- Highest efficient PV technology
- Modules without glass sheets
- Extremely light, semi-flexible foil laminates
- All modules work independently (bypass technology)
- Fully automated bi-axial tracking
- Easy to exchange in the event of damage
- Ultra-robust packaging (PELI box)
- System setup via hydraulic pump
- Separate battery unit
- All necessary components included
- 100 % stand-alone operation
- Co-generation with other generators

Power Output

Nominal power output:	2 kWp
Energy yield due to tracking:	equivalent to 2.7 kWp
Power output:	AC or DC

System

Module type:	Foil technology, without glass sheets
Cell type:	Monocrystalline
Inverter module:	Single-phase, optional

Measurement and Weight

Net system weight:	190 kg
Weight of transport box:	100 kg
Box footprint:	1.2 m x 2.4 m
Hub height:	2.3 m
Max. system height:	4.2 m
PV diameter:	3.8 m

► **NEWS:**

"Smart Energy" call for tenders

(ed/nc, Paris) The Vilnius-based NATO Energy Security Centre of Excellence (ENSEC COE) issued a call for tenders for the provision of a *Deployable Hybrid Modular Power Generation & Management System*. The submission deadline is 24 March 2015.

The ENSEC COE project places a special focus on energy security and efficiency; indeed, given their increasing dependence on Command and Control (C2) and the improvements in their networked communications, NATO's connected forces rely heavily on an assured and uninterrupted energy supply. Any potential disruption of the supply of energy to NATO's operational and deployed forces reduces their operational advantage and capabilities, jeopardising mission completion and effectiveness. The purchased system should consist of conventional diesel generators, renewable source power generators (e.g. wind, solar) and a battery storage system. These should all be linked into a Smart Energy Management System enabling the use of renewables and batteries to offset the use of diesel. The system must be interoperable with NATO/national standard equipment and be transportable in a standard ISO 20fl container or suitable for wheeling and towing via the current vehicle fleet used by the Lithuanian Armed Forces.

Vilnius (Lithuania) where ENSEC COE is located

Photo: Mantas Volungevicius, CC BY 2.0, flickr.com

Key aspects of the system

Reducing potential disruptions through the use of an effective energy management system built around the smart grid technology, allowing electricity to be distributed wherever and whenever needed, in the cheapest and most efficient way.

Energy storage capacities: a robust system would make the armed forces more flexible and the generation of electricity from renewables more reliable by reducing energy waste; this would also benefit the environment by using only the energy that is required and storing any surplus.

Use of innovative energy generators based on sustainable sources (e.g. solar, wind) in the operational environment to improve energy efficiency and reduce the energy supply chains at least for the sustainment of the units, leaving traditional energy sources and fuel for operational tasks/missions.

The use of a full and simple metering system to provide information about the system and enable the optimal method of energy use to be identified.

Source: ENSEC COE