



Air-transportable generator trailer (Grünenfelder) configured by M. Schall GmbH for EU Battlegroup field camps. Two such generators can provide electricity for a large protected tent module.

tary/medical facilities from HYREF GmbH are part of this revolutionary process. The former option is the least attractive from a military standpoint, considering the two key requirements that were drafted for mobile energy systems: easily transportable (including 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). The solution on offer by steep GmbH from Germany is the steep Mobile Solar Energy System. It consists of a fully mobile and quickly operational container equipped with a solar panel and a tent that provides space for control duties. In summary, mobile energy systems operate self-sufficiently, are quick and easy to transport, and function in a range of operational scenarios. Energy experts said that costs of PV and Concentrated Solar Power (CSP) have been declining substantially in recent years. This trend is expected to continue.

Growth Goals for Portable Energy

Portable energy concepts, namely lithium-ion (Li-ion) batteries and fuel cells, offer unparalleled advantages to the military. At DSEi 2017 in London, Epsilon Industries Ltd. from Israel made an interesting note: "In the next five years, the usage of lithium batteries

will further expand to heavy-duty platforms, such as [...] shelter applications." According to the manufacturer, the new generation of lightweight Li-ion batteries is much more powerful than traditional lead-acid batteries. SFC Energy AG believes long power autonomy is key for operating military field camp installations. In April 2015, the company unveiled its EFOY TroTrailer concept, a trailer-based hybrid power source integrating an EFOY Pro 2400 Duo fuel cell with two or four fuel cartridges, up to four solar panels for optimum power flexibility, two or four batteries, and a 60-Amp solar charger. This combination generates up to 1,000 Wp (Watt Peak) total power. "As long as the sun shines, the required power will be produced exclusively by the solar modules, with zero fuel consumption," the company noted, adding that the fuel cells will automatically start operation and fill the power gap if the solar modules do not deliver enough power. Thales incorporated its DYON technology into a deployable (fixed or tactical) smart energy communications container for in-theatre operations. This solution was extensively tested by the French Armed Forces. It improves the autonomy and resilience of a containerised communications capability, optimising energy consumption and using renewable energy sources to further reduce costs. Thales sales executives said



Basstech's Hubmaster RACKBOX NATO Storage Container.

the containerised communications capability combines low-energy generators with high-efficiency Li-ion batteries. They added that the smart energy management system automatically optimises energy production, storage, and consumption. Communications operators with no additional training can control and monitor the system from a small, dedicated console inside the container and track energy status from their own consoles as required.

Details Emerge of New Protective Measures

Detector technology, in the form of ground-based radars (GBRs) or thermal imaging cameras, can do a lot. When installed in field camps, such equipment can form passive target detection systems able to find their targets in complete darkness and against significant background noise. Any of these measures will include the fusion of information derived from multiple sensors, said Jean-Claude Griess, Sales & Marketing Manager of the electro-optics and radar specialist Belgian Advanced Technology Systems (BATS). "New threats that need to be detected [in close vicinity to field camps] include small drones and other unmanned vehicles." But there also is a requirement to detect and neutralise rocket, artillery and mortar (RAM) projectiles and their firing positions.

One solution can be found in Saab's GIRAFFE 4A radar that was used to detect and track very small unmanned aircraft during live customer trials in autumn 2013. In the lab, the 4A radar showed twice the range of the company's GIRAFFE AMB (Agile Multi Beam) radar, Saab Electronic Defence Systems said. It monitors the 360-degree air volume for air targets and simultaneously locates and warns against incoming RAM projectiles. With an instrumented range of 75 km, it can also detect and track small unmanned aircraft in high-clutter environments. Another issue is decontamination. Kärcher Futuretech (KFT) developed the MEP Cage Module System. The company is pitching the solution as a "flexible configuration of individual modules" known as cages, to allow it to be deployed "in line with changing demands." The modules can be "simply mixed and matched," according to the company, plus they offer enough space for other devices, chemicals or accessories, as required by the individual scenarios. A variety of items typically seen in military field camps can be decontaminated, including vehicles, road sections, interior spaces or individuals. Field camps, like other military installations, may be facing additional threats, and there are persistent questions as to whether some

of them can be eliminated by additional means: counter-drone and counter-IED (C-IED) methodologies; barriers; and weapons for self defence. Ebinger Prüf- und Ortungstechnik GmbH, promoting its handheld UXO PIDD 2 detector, noted at the Industry Day at the NATO Military Engineering (MILENG) Centre of Excellence (COE) in early December 2016 that "detector technology needs to be consistently improved to better cope with completely new threats," also referring to field camps in warzones. Another manufacturer, SENSYS Sensorik & Systemtechnologie GmbH, stated that the demand for items of this kind in the process of securing field camp infrastructures is growing. SENSYS offers a portable magnetometer survey kit for drone-based UXO detection, named MagDrone IV. The use of barriers is not new, and industry noted that the demand for items of this kind, following the number of terrorist attacks in France, Germany, Spain, and the UK, is growing. Mifram's Modular Vehicle Barrier (MVB) can be part of this scheme. The barrier's 'L' shape stops vehicles travelling at high speeds by transferring the vehicles' horizontal momentum to vertical momentum, regardless of its speed, said the Israeli manufacturer. As a passive pe-

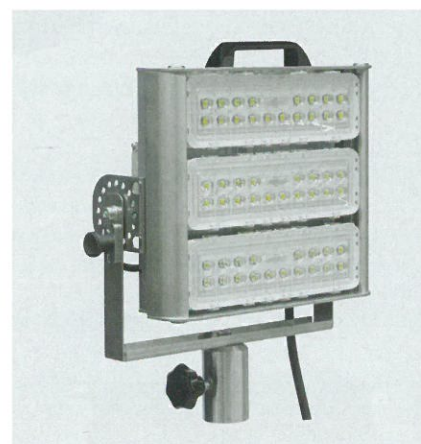
rimeter barrier designated as an 'anti-ram barrier', the MVB is capable of stopping all types of vehicles, ranging from motorcycles, land rovers, and all-terrain vehicles, to light trucks. Thousands of units have already been sold to the US military for protecting assets. In Iraq, the American military stopped trucks weighing dozens of tonnes efficiently by spreading a number of lines of MVB units, thwarting any chance of the truck creating the necessary speed and momentum. Meanwhile, the French Navy has also begun using the modular system.

Conclusion

It is clear that the route chosen by field camp operators will lead to substantial changes in the planning, design, and construction of such facilities, as well as investments in modern, threat-driven equipment. Deals with industrial suppliers will have an interesting side effect: both sides, military and industry, could strengthen their ties based on experience harvested in crisis zones and warzones around the world. This could result in the joint exploration and evaluation of new, alternative, fundamental technologies, a process that has never happened before.



ALDEBARAN RAPTOR-series LED floodlights (left) consume less than one-sixth of the energy of comparable halogen floodlights, while generating up to 40% more light at the same time. Note the X-PECT lens system (right) that collects the produced LED light and delivers the required illumination.



Photos: SETOLITE Lichttechnik GmbH

FUTURE FORCES FORUM International Platform for Trends & Technologies in Defence & Security | **17-19 October 2018** PRAGUE, Czech Republic
www.future-forces-forum.org

- Future Forces EXHIBITION
- World CBRN & Medical Congress
- Future Forces Individual Systems Congress
- Logistics Capability Conference
- Future of Cyber Live Hacking Zone
- NATO MILMED COE CD&E Workshop
- NATO M&S COE Modeling & Simulation for Autonomous Systems Conference
- Geospatial, Hydrometeorological and GNSS Conference
- Multi-domain Advanced Robotic Systems Conference
- Biometrics Conference
- Official expert working groups' sessions (NATO, EU)
- and more

