

Will future soldiers be made of Semiconductor? ¹

OUTLINE:

- Forecasts:
The global market for infantry equipment related to semiconductor technology will reach US\$12.4 billion in 2025 and US\$17.5 billion in 2030.
The global military spending has grown from US\$17 billion in 1949 to US\$1,868 billion in 2019.
- Market and technology trends:
The technologies investigated for foot soldiers have different maturity levels and will follow different paths...
Infrared is aggregating many technologies around night vision goggles and thermal weapon sights.
Dual-use is also an interesting approach to exploit civilian developments for defense.
- Supply chain:
Examples of players: BAE Systems, Leonardo DRS, L3 Harris, Thales, FLIR, Raytheon and CETC.
For USA, defense is the playground of giant companies that are able to set up a dedicated new factory in a country where they want to address a market.
The Defense industry is already defining 2050 major priorities.

“The global market for infantry equipment related to semiconductor technology will evolve from US\$9.1 billion in 2020 to US\$17.5 billion in 2030.” asserts **Alexis Debray, Technology & Market Analyst, MEMS, Sensors & Photonics at Yole Développement (Yole)**.
Although the usual narrative states that the world has enjoyed peace and prosperity since the end of World War II, in reality global military spending has grown from US\$17 billion in 1949 to US\$1,868 billion in 2019.

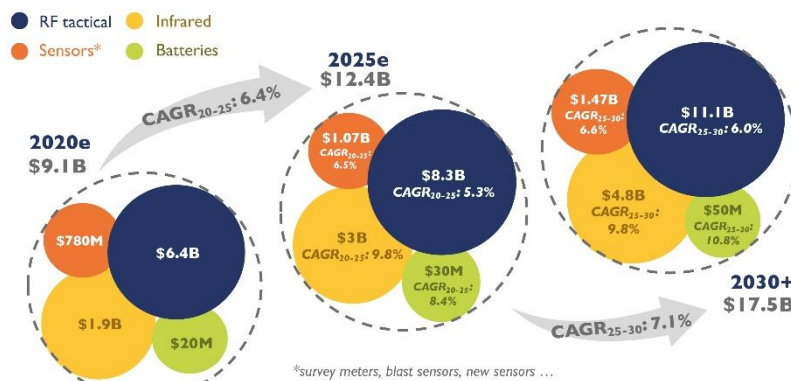
In this context, Yole investigates disruptive technologies and related markets in depth, in order to point out the latest innovations and underline the business opportunities.
Released today, the Future Soldier Technologies 2021 report analyses the current and future technologies for foot soldiers for better communications, enhanced lethality, mobility,

¹ Extracted from: Future Soldier Technologies 2021, Yole Développement

survivability, and sustainability. This report gives the complete analysis of semiconductor related equipment for infantrymen: their applications, players, and markets, including infrared and radiofrequency, as well as sensors, batteries, exoskeletons, and future technologies. What are the economic and technological challenges of the future soldier technologies industry? What are the current world’s needs for defense applications? What are the dual-use strategies? What are the main companies involved in defense? Yole presents today its vision of the future soldier technologies.

2020-2030+ Future soldier technologies - Global market forecast

(Source: Future soldier technologies 2021 report, Yole Développement, 2021)



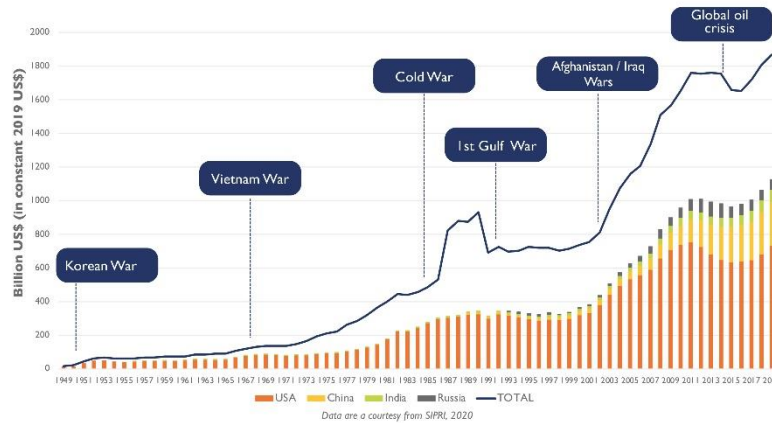
As analyzed by Yole’s team in the new Future Soldier Technologies 2021 report, wars, of course, never really ended – and as Clausewitz wrote: “*War is the continuation of politics by other means.*” Though the rivalry between the USA and China is the main topic of today’s geopolitical scene, there are hotspots everywhere. Furthermore, the expansion is not only geographical: Space, internet, social media, and the electromagnetic spectrum are new domains where militaries are preparing to fight. In this context, the equipment and semiconductor technologies of infantrymen have adequately evolved. Inherited from the Vietnam War, infrared is a major technology of infantrymen, as is radiofrequency for communication and, more recently, for electronic warfare at the tactical edge. Other technologies, such as sensors and exoskeletons, have not developed as much.

“Operational environment” is a key concept in military operations. It defines the platforms and technologies used on the battlefield. Choosing the wrong operational environment for a conflict can dramatically affect its outcome. By the end of the Vietnam War, the major military powers started to develop and adopt night vision devices thanks to technical progress made in the 1970s. During Operation Desert Storm in the 1990s, night vision was a major advantage for the US military and many operations occurred at night. As a result, for five decades, infrared technology has been one of the most important military technologies.

But what is the next operational environment?

1949-2019 global defense spending history

(Source: Future soldier technologies 2021 report, Yole Développement, 2021)



According to **Eric Mounier, Director of Market Research at Yole:** “At the end of the 2010s, during the War in Donbass, the Russia military was able to defeat Ukrainian operations without firing a single shot. Powerful electromagnetic devices suppressed communications and command, jammed GPS, shut down radars, and grounded aircraft operations. While electronic warfare and cyber operations are increasing, we may witness the convergence of communication, electronic warfare, Cyber, and Space domains. The future soldier will take part in all of these operations, fighting with the use of computing and electromagnetic technologies”.

Contrarily, technologies related to other operational environments have not developed as much. Nuclear power has remained a deterrent technology and survey meters have not multiplied. Apart from the Japanese Aum Sect and incidents in the Syrian civil war, the use of biological weapons has been minimal, resulting in limited development in chemical sensors. Around 2050, it is expected that infantry technologies will evolve more to human/machine fusion, be it for brain-computer interface, ocular enhancement, auditory enhancement, or muscular control. However, we should remember that war is all about the unpredictable.

All year long, Yole Développement publishes numerous reports and monitors. In addition, experts realize various key presentations and organize key conferences.

Make sure to be aware of the latest news coming from the industry and get an overview of our activities, including interviews with leading companies and more on i-Micronews. Stay tuned!

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About our analysts

Alexis Debray, PhD is a Technology & Market Analyst, Optoelectronics at Yole Développement (Yole). As a member of the Photonics, Sensing & Display division, Alexis is today engaged in the development of technology & market reports as well as the production of custom consulting projects dedicated to the imaging industry. After spending 2 years at the University of Tokyo to develop an expertise focused on MEMS technologies, Alexis served as a research engineer at Canon Inc. During 15 years he contributed to numerous projects of development, focused on MEMS devices, lingual prehension, and terahertz imaging devices. Alexis is the author of various scientific publications and patents. He graduated from ENSICAEN and holds a PhD in applied acoustics.

With more than 25+ years' experience within the semiconductor industry, **Eric Mounier PhD.** is Director of Market Research at Yole Développement (Yole). Eric provides daily in-depth insights into current and future semiconductor trends, markets and innovative technologies (such as Quantum computing, Si photonics, new sensing technologies, new type of sensors ...). Based on relevant methodological expertise and a strong technological background, he works closely with all the teams at Yole to point out disruptive technologies and analyze and present business opportunities through technology & market reports and custom consulting projects. With numerous internal workshops on technologies, methodologies, best practices and more, Yole's Fellow Analyst ensures the training of Yole's Technology & Market Analysts. In this position, Eric Mounier has spoken in numerous international conferences, presenting his vision of the semiconductor industry and latest technical innovations. He has also authored or co-authored more than 100 papers as well as more than 120 Yole's technology & market reports. Previously, Eric held R&D and Marketing positions at CEA Leti (France). Eric Mounier has a PhD. in Semiconductor Engineering and a degree in Optoelectronics from the National Polytechnic Institute of Grenoble (France).

About the report

Future Soldier Technologies 2021

Semiconductor technologies will enable increased mobility and communication for the soldier of the future. – Performed by Yole Développement

Companies cited:

Aerovironment, ATN, BAE, Bharat Electronics, Biofire, BlackBox Biometrics, BTI, Canberra, Carl Zeiss, CETC, Concern Sozvezdie, Controp, Cosinuss, Cyberdyne, DALI, Device Alab, DRS, EADS, Ekso Bionics, Elbit Systems, ELNO, ESC BAZ, Exelis, Finmeccanica, FLIR, GST, GWIC, Hanwha, Hensoldt, Hikvision, Hocoma, Huneeed Technologies, I3 System, IR&D, Iray, Kinetek, L3 Harris, Leidos, Leonardo, Liteye, Lockheed Martin, Lynred, Macom, Magnity, MediTouch, Mikrosens, Mitsubishi, MSA Gallet, myomo, NEC, Nemesis Robotics, Nexter, Nielsen, NIT, Northrop Gruman, Opgal, Otolith, Ottobock, Photonis, QinetiQ, Qorvo, Rafael, Raytheon, Rehab Robotics, Renault Trucks Defense, ReWalk Robotics, REX Bionics, Rheinmetall, Roki, Ruselectronics, Saab Grintek, Safran, Sagem, Sarcos, SCD, Sensors Unlimited, Sionyx, SPI, SuitX, Teledyne Princeton Instruments, Thales, Theon Sensors, Thermoteknix, Vectronix, Zeiss Optronics, and more...

Related reports:

- [Thermal Imagers and Detectors 2020](#)
- [Status of the MEMS Industry 2020](#)
- [GaN RF Market: Applications, Players, Technology, and Substrates 2020](#)
- [MACOM NPA1008 RF Power Amplifier with GaN-on-Si HEMT](#)
- [iRAY T3S Thermal Camera Performance Analysis](#)

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Founded in 1998, Yole Développement (Yole) has grown to become a group of companies providing marketing, technology and strategy consulting, media and corporate finance services, reverse engineering and reverse costing services and well as IP and patent analysis. With a strong focus on emerging applications using silicon and/or



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