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**CHALLENGES ADDRESSED TO THE MILITARY  
ORGANIZATIONS REGARDING THE MANAGEMENT OF  
PUBLIC INFORMATION. CASE STUDY STRAVA MAPS.**

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**Abstract:**

Smart devices have become the perfect accessories of the knowledge-based society. Military organizations, like civilians, try to benefit from the usefulness of social media applications that surround us today, but the main feature of these tools, to share data and user-generated media content, is a challenge to managing the information resource in the military field. The paper analyzes the effects generated by the use of the Strava Maps application inside the military bases and the security breach generated by the online posting of StravaMaps.

*Key words: Strava Maps, Heat Maps, crowdsourcing, privacy culture, social media*

## **1. Introduction**

The emergence and expansion of the Internet along with the development of technology and communications has changed the society that has evolved from one marked by tools specific to the industrial revolution to one marked by smart devices and social networking. Personal smart devices (phones, tablets, watches, fitness bracelets) have become the perfect accessories for people looking for a lifestyle specific to the new information age. The Internet that originally connected only computers “it has evolved into a network of device of all type and sizes, vehicles, smart phones, home appliances, toys, cameras, medical instruments and industrial systems, animals, people, buildings, all connected, all communicating & sharing information based on stipulated protocols in order to achieve smart reorganizations, positioning, tracing, safe & control & even personal real time online monitoring , online upgrade, process control & administration” [1]. And the trend is a constantly growing interconnectivity of smart devices. “With the recent development in cloud computing and adoption of the Internet of Things (IoT), the number of encoding and monitoring devices on IoT are expected to remain on the rise” [2]. Applications have been developed to allow not only complex communication (text, voice, video) between users but also to avoid time-consuming activities or those that require the physical presence of the person in the location (online shopping, banking, knowledge sharing, transport and traffic mobility). The relationship between users and private companies has changed and most businesses have adapted their information flow, both internally and in relation to external customers. „Social technologies can provide a potent means for organizations to manage their information flows and thus induce changes in their knowledge management (KM) systems, which can then be linked to performance improvements”[3]. Military organizations, like civilian ones, must adapt to the trend imposed by this phenomenon of sharing the data on social media by identifying and practicing an efficient management of public information that takes into account the limitation of the risk of security breaches.



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The article aims to identify the risks posed by the use of smart devices within military organizations and how the use of this personal, public information collected by these devices may affect the security of these organizations.

In my scientific research I used the case study approach, by conducting a comprehensive and detailed investigation of the Strava Maps application and the phenomenon known as HeatMaps. The information needed for the study was collected from various sources such as: the developer's official website, the policies applied within the Strava application, articles, news and various public sites. During the study I used research methods such as content analysis, interpretation and comparison of collected data, all this making it possible to establish a scientific point of view based on the chosen topic.

## **2. The Stava Maps application**

Strava Maps is an application for athletes, through which you can upload and distribute content media related to training information made by amateurs or professionals. It first appeared in 2009 in San Francisco and over time has become one of the favorite applications of both runners and cyclists.

The features of Strava Maps are displayed by the developer on the first page of the application site, as follows:

- *Track and analyze every aspect of your activity;*
- *Connect with friends and share your adventure;*
- *Explore new routes and compete with a global community [4].*

### **2.1 Track and analyze every aspect of your activity**

The first feature includes information about the training or activity recorded and users can enjoy the following data: time spent training, distance traveled, average time per kilometer, level differences on the route traveled plus many other details in the premium version of the application (subscription) . These recordings can be made with a smart device equipped with a GPS sensor (Global Position System) such as a watch, phone or fitness bracelet that can then be transferred to a personal computer or laptop. This archive of activities is an essential source for analyzing the results and progress made by athletes over time.

### **2.2 Connect with friends and share your adventure**

But probably the feature that made Strava a successful application globally was its ability to distribute training results to friends and Social Media users. This second feature mentioned on the application's website, to connect friends, is the strong point of Strava maps, and the existence of sports diaries posted online is both a motivational source in the sense of "measure how hard you try" but also the ability to identify the level of competition readiness [5]. Strava supports the goal of becoming "the social network for athletes" through initiatives aimed at users to upload and distribute their own content and interact through likes (kudos), messages or comments on the performance of other users. Connecting Strava users to online groups, sports clubs or just participating in certain joint trainings or sporting events has led to the creation of a true Strava community. Club identification can be done from the application website according to the



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desired criteria (location, activities, type of clubs) along with other information such as subsequent events, rankings, discounts at sports equipment stores or other information in the area of interest of members. In the premium version, the application offers through the Beacon function the possibility to distribute the location within the training in real time. A function that can prove useful in these restrictions imposed by the COVID 19 pandemic in which coaches can extremely easily check the performance of athletes forced to stay at a distance, And to make the content more attractive, Strava allows you to upload photos or captures made by athletes on the training itinerary, features probably also introduced for the reason of growing in the top of social networks of athletes.

### **2.3 Explore new routes and compete with a global community**

Transmitting and accepting a challenge regarding high-performance training or unique routes is the vision of Strava to take athletes out of their daily routine. Moreover, subscription users can access routes used by other athletes in unknown locations, during holidays or business trips where they do not have time to investigate the terrain to identify the desired route.

### **3. Strava Heat Maps**

Strava has taken to another level the desire to establish itself as a market leader in sports applications by collecting the routes used by Strava users and publishing them on the Internet. The application overlapped the routes used by users and published an online map (Strava Heat Map) of the "hot" routes, meaning the map of the most used routes of athletes from all over the world [6]. This collection of data and information with the help of crowds, to achieve their own goals, is not a new feature of Social Media companies and is known as crowdsourcing. The phenomenon derives from the words Crowd and Sourcing and was first used by Jeff Howe in 2006. The term's popularity has grown with the expansion of the Internet, and the widespread use of smart phones. Crowdsourcing is the use of digital technologies to gather and organize contributions from a multitude of nonprofessional individuals in order to obtain innovative ideas or products [7]. In Fig. 1 we can identify the map generated by the athletes from the Brasov city region.



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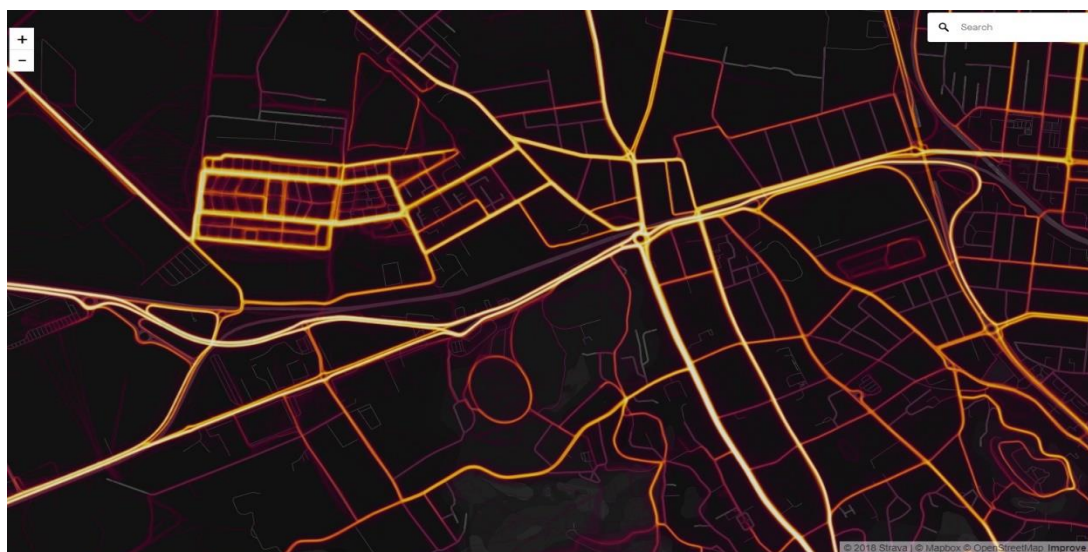


Fig.1 Strava Heat Map - Brasov city area [8]

In our case, we address with priority the information regarding the spatial location. „*Spatial Crowdsourcing, as a new direction for crowdsourcing has become more and more popular and has been applied in many real applications. A typical spatial crowdsourcing platform assigns a number of moving workers to perform spatial tasks nearby, which requires workers to physically move to some specified locations and accomplish these tasks*”[9].

Using the multitude of athletes in the database, Strava collected and developed precise itineraries that follow the routes used for training, which led to the creation of accurate maps of areas around the globe.

As with other applications, the terms of use of the service are tens of pages (approximately 35 screen pages) and the search for references to the right to distribute content shows that Strava reserves the right to use user-generated content while using the application (see Fig. 2).

**Member Content and Conduct**

**Content**

You own the information, data, text, software, sound, photographs, graphics, video, messages, posts, tags, or other materials you make available in connection with the Services (“Content”), whether publicly posted, privately transmitted, or submitted through a third party API (e.g. a photograph submitted via Instagram). **Public segments and routes** created by using the Services are not considered Content. **You grant us a non-exclusive, transferable, sub-licensable, royalty-free, worldwide license to use, reproduce, modify, adapt, publish, translate, create derivative works from, distribute, publicly perform and display any Content and any name, username or likeness that you post on or in connection with the Services in all media formats and channels now known or later developed without compensation to you.** This license ends when you delete your Content or your account.

You understand that you, and not Strava, are entirely responsible for all Content that you upload, post, email, transmit or otherwise make available via the Services. Strava does not proactively and routinely screen or monitor the Content posted to the Services by others and, as such, does not guarantee the accuracy, integrity or quality of such Content. Strava may, in its sole discretion, screen, monitor, refuse or remove any Content, or remove any Content that violates the Terms or is otherwise objectionable. You understand that by using the Services,

Fig. 2 - Strava Terms of Service [10]





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The acceptance of these rights to use the content ends when the account is deleted but does not apply to public segments and routes created:

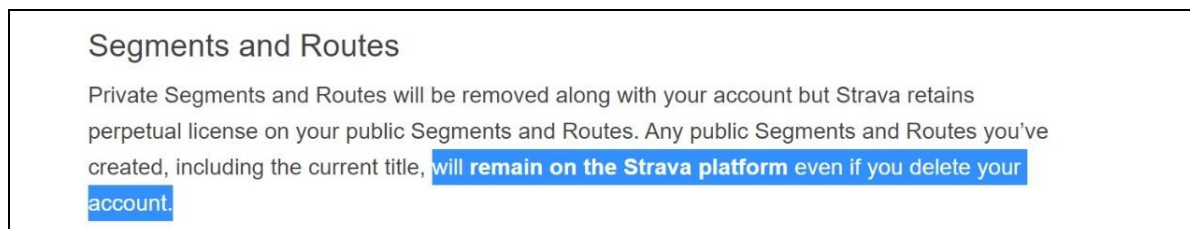


Fig. 3 - Strava Terms of Service

Therefore, based on these terms accepted by all users of the application, this content related to the routes will remain online even if the user who created them wants to delete them or decides to leave the application and deactivate his Strava account.

#### **4. US Army physical training program**

Like other organizations, the military is trying to take advantage of the advancement of technology and social media. Most military units have now created Facebook, Instagram or Twitter pages in which they upload media content from their daily activities. This trend of using useful applications for soldiers also appeared in the case of Strava. „*The Pentagon has encouraged the use of Fitbits among military personnel and in 2013 distributed 2,500 of them as part of a pilot program to battle obesity*”[12]. The benefits of the program result from the features of the application that allows soldiers to record their exercises to identify the evolution and performance of physical training (PT). These benefits are especially evident in the case of soldiers deployed at a long distance, so apart from strict supervision of the "sergeant".

In the case of military personnel deployed in theaters of operations such as Afghanistan, or other sensitive areas, the following issues have been identified:

- The soldiers did not take their bracelets off their hands because they carried out their activity 24/7 inside the military bases. They did not go out with friends or have dinner at restaurants where the evening dress required the removal of sports accessories. In this way, the bracelets became an almost permanent sensor for soldiers in military bases. The training is started and stopped by the users and if the user forgets to stop the training, the device continues to record the routes used by it. Thus, the itineraries of the soldiers from the military bases, regardless of whether they went to the dining room or the gym or to the tactical command center, were recorded and uploaded by Strava in HeatMaps.
- Not all military bases have runways or other routes that can only be used for running. Because training in conflict zones cannot be performed outside the FOB (forward operation base) for security reasons, the military uses the inner perimeter of the base or the longest routes to avoid routine or running in small circles. For this reason, the routes used for training overlap with the itineraries used daily by the military personnel and will include all practicable roads inside the base.



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Based on these behaviors, Strava's decision to publish all the routes used by the military users of the application led to the loading of fairly accurate maps of military bases such as the one in Kandahar, Afghanistan (see fig. 4).



Fig. 4 - Kandahar military base heatmap [13]

In the context of countries such as Afghanistan, Iraq or Syria where the population does not use smart devices to monitor training, the uploaded maps are clearly assigned to users from Western countries.

Subsequent investigations showed that Strava Heatmaps revealed not only maps of well-known US military bases (Afghanistan, Iraq, Somalia, Yemen) but also activities carried out by undercover CIA agents or activities of the Russian military in Syria or the French military in Niger [14].

Strava has taken to another level the desire to establish itself as a market leader in sports applications by collecting the routes used by Strava users and publishing them on the Internet. The application overlapped the routes used by users and published an online map (Strava Heat Map) of

## 5. Conclusion

The security breach created by this management of public information is a lesson that military organizations must learn. As we have identified from the above analyzes, the risks of the military field are not limited to the protection of classified information. Public information is becoming as sensitive as classified information, and this example of collecting and publishing maps of "human trafficking" may be useful to terrorist groups. They, using drones or guidance systems based on geographical coordinates extracted from a Strava route, can set their target in heavily populated places inside a military base.

Regulations on the use of applications for athletes have been updated by military organizations. But the challenge of managing the data collected by social media applications within military organizations is not fully resolved. There are dozens of applications that are based on the use of data and user-generated content and the real intentions of these applications, which have become a lifestyle of the present, are not always known. The main cause is generated by the lack of information: "A Deloitte survey of 2,000 U.S. consumers in 2017 found that 91% of people consent to terms of service without reading them. For younger people, ages 18-34, that rate was even higher: 97%" [15]. The user clicks



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the box with terms and conditions but does not allocate the necessary time to read dozens of pages from which to clearly understand how personal data will be used or the media content generated. The European Union has imposed that “*privacy notices must be in concise, transparent, intelligible and easily accessible form, using clear and plain language*” but these requirements do not fully apply [16]. The situation is alarming considering that “*In a world where there are over 2 billion smartphone users, and the average smartphone user has 60-90 apps, almost no one reads app privacy notices, not to mention website privacy policies*”[17].

In some cases, applications fail to inform all situations in which they can use user data and content. Either due to the fact that certain actions are difficult to verify or aggressive terms will not be accepted by users. Or they just didn't know from the beginning that they could use data and media content in other ways. Start-up applications may use softer privacy policies, but as they gain popularity and a large number of users, they can change or adapt their policies to suit other interests. Once the user has become familiar with the application, it is hard to believe that he is looking for an alternative due to "insignificant" privacy updates, which makes the "take it" option more attractive than the "leave it" option.

Many applications also require access to data or features that they should not use, but this permission requires the user's attention when installing the software or even a subsequent review of the rights granted.

There needs to be a change in the mentality of social media users who usually assume that the data and personal media content uploaded to the online environment cannot affect him, his own family or the organization he belongs to. This change requires the development of a new mentality, a culture of privacy specific to the smart device era by forming a critical thinking that will ultimately lead to a more accurate understanding of how social media applications and platforms collect and use personal data and media content generated by users.

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