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AVALANCHE AWARENESS ACCESSING VIDEO CLIPS FOR EFFICIENT GEO-COMMUNICATION – MAPS, DIAGRAMS AND STORYTELLING IN ACTION

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ABSTRACT

This contribution deals with the utilization of video clips for efficient geo-communication in avalanche warning services worldwide and exemplifies various methods of implementation. Within this framework characteristic video clips with specific cartographic content will be deconstructed in order to understand geo-relevant information and thus offer insight in the multitude of possibilities to communicate avalanche awareness. Thereby various options for integrating maps as well as map related representations will be specifically addressed. As an analysis tool, a modular system is used to capture and structure essential cartographic design techniques. This form of abstraction is used subsequently to simplify the reproduction of video clips with geo-relevant content.

Various modules that are being currently adopted at several avalanche warning services will be analyzed. The result of the analysis will be presented and used as a framework to demonstrate their practical customization. On the one hand, the modular system will be exemplified in video clips based on the ten avalanches patterns developed by the Avalanche Warning Service Tyrol, Austria. Thereby the combination of the AIDA principles (Attention,

Interest, Desire and Action) will be described. On the other hand, a semi-automatic video clip production process will be introduced to underpin the feasibility of such a procedure embedded in a real time environment documenting the current avalanche and snow conditions. Both approaches are being currently investigated as well as preliminary adopted by the Avalanche Warning Service Tyrol, Austria.

Keywords: avalanche awareness, geo-communication, video clips, storytelling

1 INTRODUCTION – AVALANCHE AWARENESS

Alpine Space in general is often seen as a fascinating and enjoyable environment for all kinds of ventures; however it comprises potential risks that must be taken into consideration when residing within such settings. Year round mountaineers and hikers must be aware of this fact. Especially during the snow covered season avalanche danger plays an important role in mountainous areas. Consequently avalanche assessment requires thorough examination and intensive monitoring. Regional as well as national Avalanche Warning Centers worldwide have set their goals to facilitate awareness and recognition of the potential danger of avalanches and, consequently increase prevention of avalanches in open terrain. This is achieved through risk assessment that is being made available to the public (Mair 1999: 110ff.). Local weather and snow data are monitored and used to assess the potential danger. The collection, processing and communication of geo-relevant information in this case is of paramount importance (Land Vorarlberg 2016). In particular, the efficient communication of complex issues to the general public – in the sense of geo-communication – represents a major challenge.

2 GEO – COMMUNICATION

According to Bollmann et al. (2002) geo-communication underlies the principle of sending and receiving spatial information in a standardized environment. The content must first be brought into a suitable form for communication in order to be transmitted in a further step via an information carrier from the transmitter to the receiver. If the content has a spatial reference the main information carrier for transmission is traditionally the map. However various tools and formats utilizing modern technology provide nowadays a broad spectrum of possibilities. In this context multimedia formats play an important role (Kriz 2013: 10) whereby video clips are especially significant.

Related to geo-communication maps, diagrams and texts are primarily used to enable the above-mentioned prevention of avalanches. However, the Austrian Avalanche Warning Centers are aware that the aforesaid information carriers are not always sufficient enough to reach their goals. According to Consortium of the Austrian Avalanche Center (ARGE – Lawinenwarndienste Österreich 2015: 33) statistics show only a slight decrease of avalanche victims in Austria over the last 20 years. The discussion among experts in the season report of the Austrian Avalanche Warning Centers 2014/15 „Lawinenlagebericht – Das ungelesene Wesen“ (ibid.: 260) highlights the dissatisfaction with the current forms of communication.

Consequently, the search for alternatives opposed to the traditional settings of available avalanche reports is of great importance due to the fact that the syntactic, semantic and pragmatic rules of existing information carriers are more often not understood by the general public (Kriz 2013: 12). Therefore, the inclusion of external methods is necessary to achieve

the goal of avalanche prevention. If geospatial information is emotionalized one speaks of geo-communicational storytelling. Thus, the need for an appropriate information carrier is indispensable to meet on the one hand the demands of geo-relevant information transfer and on the other hand to emotionalize the process. According to Mallon (2003: 2) video clips are suitable for storytelling whereby a multimedia presentation of the aforementioned content is meaningful.

Considering alternative forms of communication for Avalanche Warning Centers, video clips can serve as a new information carrier and offer the possibility to combine geospatial content with emotions.

3 STORYTELLING – AIDA

Storytelling without emotions and dramaturgical structuring leads to no feasible result. Therefore, an established concept for controlled management of emotions is necessary. In 1898 E.S.E. Lewis introduced one of the oldest scientifically proven advertising principles called AIDA: *Attention, Interest, Desire and Action* (Jacobi 2013: 54). By going through all four stages, the emotions of the addressee are conducted in accordance to the content (Ostheeren 2003: 227). This approach can be used today for avalanche prevention to emotionalize storytelling.

By means of the first stage *Attention* awareness of the recipient is obtained. The so-called eye-catcher is of special importance and can achieve its objective by using impressive images. However, if a video clip just starts with introductory text, it must take over the role of the eye-catcher and compensate the absence of a striking introduction.

According to Lewis the second stage after *Attention* is *Interest*. Critics point to the disagreement of the order due to the fact that *Interest* is also often used as a first stage (ibid.: 57). In order that the awareness is not interrupted specific modules within this stage serve as suspense activators. To stimulate the awareness of the potential danger of avalanches animations are suitable that communicate the basic functionality of such events. This way the addressee can learn the basic principles of avalanches without being confronted with them in reality.

Based on the information from level two *Interest* level three *Desire* is generated and coincides with the purchase of a promoted product in advertising. Regarding the awareness of the potential danger of avalanches the aim of this stage is to stimulate a desire of the addressee to handle the avalanche problem in reality. The above-mentioned suspense built upon the deliberate omission of reality-based information can be resolved here by showing for example video clips of avalanches triggered by skiers in the backcountry.

In order to conclude the AIDA concept the final stage *Action* is of great relevance. In advertising *Action* means to purchase the promoted product that leads consequently to marketing success. Generally speaking this process can be described as implementing what has been learned in the first three stages into practice. In cartography this procedure is defined according to Hake et al. (2002) as the tertiary model. This process finds its use in raising awareness through the presentation of an application-oriented guidance in the fourth stage of the AIDA concept. As a basis for planning the communication of spatial information the inclusion of a map that is efficiently designed is beneficial.

Considering the oldest advertising concept AIDA, all four stages can be seen as empty containers which build the emotional framework for geo-relevant information integration. Hence the AIDA concept serves as a clear guide for the structure of storytelling.

4 AVALANCHE STORYTELLING CONTAINER MODULES

The previously discussed concept in chapter "Storytelling - AIDA" can be seen as a container that must now be filled with content. To identify and tackle this process a survey was undertaken of existing selected video clips of potential avalanche hazards from avalanche warning centers worldwide (AWS 2016). By breaking down the evaluated information into individual components knowledge retrieval was pursued. All examined video clips were divided for easier detection into categories and their components broken down into specific modules.

The analysis showed that all examined video clips can be subdivided into three areas: *Current Situation, Avalanche Investigation, Facts Worth Knowing*. The components of each area can then be divided into primary and secondary containers. The properties of the primary container can be described as basic elements. These are needed for the video clip production and post processing. Consequently, video clips have always an assured basic set of primary components.

The secondary container components distinguish themselves by clarity which again is accompanied by high complexity. This can be seen as transformation of the basic elements into a finished concept. Thus the secondary container modules fulfill the requirements of AIDA to achieve emotional integration of geo-relevant information.

Four selected examples illustrate this conceptual approach:

1. Introduction video sequence of the Utah Avalanche Center.
2. Animation sequence of the Canadian Avalanche Warning Service.
3. Video sequence of the Utah Avalanche Center showing an avalanche event.
4. Map use New Zealand Avalanche Warning Service.

4.1 INTRODUCTION VIDEO SEQUENCE

Video clips of the Utah Avalanche Center always start with the same intro so that the assignment of the following content is clear. The introduction consists of the primary module components text, animation and video as well as the secondary module element logo. The logo is made up of the text and animated graphics (= animation). Combined with the module element video it can be seen as a separate secondary component.

Figure 1: Screenshot from the introduction video sequence of the Utah Avalanche Center.

4.2 ANIMATION SEQUENCE

To show how a weak layer develops within a snowpack an animation according to the definition of Tversky et al. (2016: 247) is presented in a video sequence by the Canadian Avalanche Warning Service. This type of computer animation can be seen as a standalone primary module element and communicates particularly complex processes in a very simplified and abstract manor.

Figure 2: Screenshot taken from an Animation sequence of the Canadian Avalanche Warning Service showing how a weak layer starts becoming a snowpack.

4.3 EVENT VIDEO SEQUENCE

A genuine video sequence of a realistic event can produce a profound impression in contrast to an animated sequence. As shown in an example below the message "How is an avalanche triggered in open terrain" is clearly communicated.

Figure 3: Screenshot from a video sequence of the Utah Avalanche Center showing how an avalanche is triggered.

4.4 MAP USE

The use of maps in video clips can be seen as a separate module. In contrast to the primary container modules described above such as text or video maps can display very complex scenarios in a very effective and efficient way. Their depiction is however dependent on design issues that have a high impact on how these spatial representations are perceived and finally understood. Designing a map that is equally appealing as well as informative and then integrating the result in a story is a demanding task for itself. This also somehow explains why only one map was found in the evaluated video clips despite the high potential of efficient spatial communication. In the video clip of the New Zealand Avalanche Warning Service the integration of the map is filmed off a screen unfortunately in a very unsuitable way. However generally speaking this approach gives the use of maps a large amount of potential for optimization.

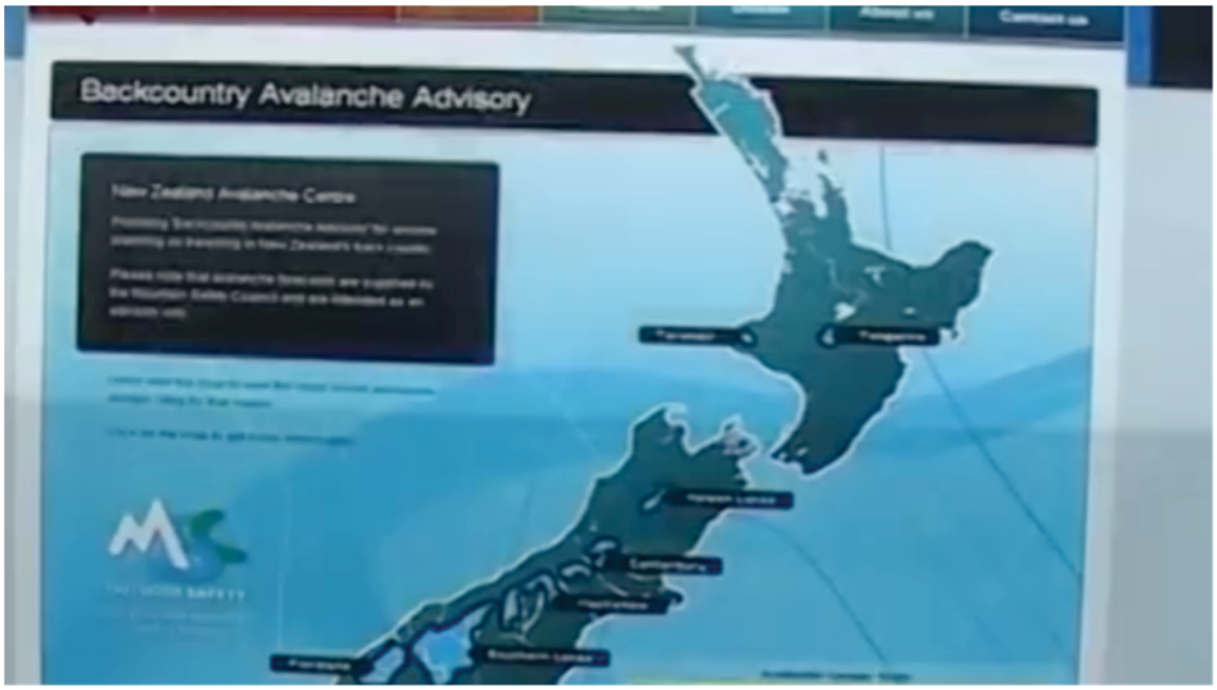

Figure 4: Screenshot of a map of the New Zealand Avalanche Warning Service that was filmed from a screen.

5 MAP INTEGRATION

The integration of maps in videos as static or dynamic installations can be implemented in various different ways. The question however arises what additional benefit do these maps have when included in video clips. The added value is clearly seen when dynamic effects are integrated in the representation. This is based on the assumption that on the one hand the communication of temporal issues are important for the general understanding of chronological processes. On the other hand the presentation of spatial information is necessary for the extraction of locational information. With the appropriate integration of maps in a video clip both critical features merge and eventually lead to the efficient symbiosis of spatio-temporal information. However to ensure this effective geo-communication in a video clip it is not primarily necessary to have both mentioned features co-exist in one installation. It is more important to ensure that both temporal as well as spatial issues are addressed in either one or the other module. Therefore, the map can be seen as an important but not as a mandatory part of a video clip. Efficient communication of geo-related information does not depend on the defined containers and the fancy dynamic features that are implemented but moreover how the story is conveyed, applied, orchestrated and finally carried out.

The integration of maps in video clips allows numerous possibilities of representation that can enrichen and support the overall information transfer. In general video clips utilize three categories of map integration:

1. Map as a navigational source.
2. Map as a thematic information carrier.
3. Map as an esthetical design factor.

5.1 MAP AS A NAVIGATIONAL SOURCE

Orientation in the field plays an important role for risk assessment. A large scale topographic map can be regarded as one the most appropriate instruments for such tasks (Bollmann et al. 2002). When combining maps as a navigational source in video clips it is important to understand the power of maps as well as their dimensional characteristics. The classical planimetric 2D map view gives a good overall understanding of terrain however requires a high level of user expertise to extract relevant information. 3D static as well as dynamic map representations on the other hand communicate an easy understandable and familiar view of the earth's surface however restrict the observer to predefined areas of interest.

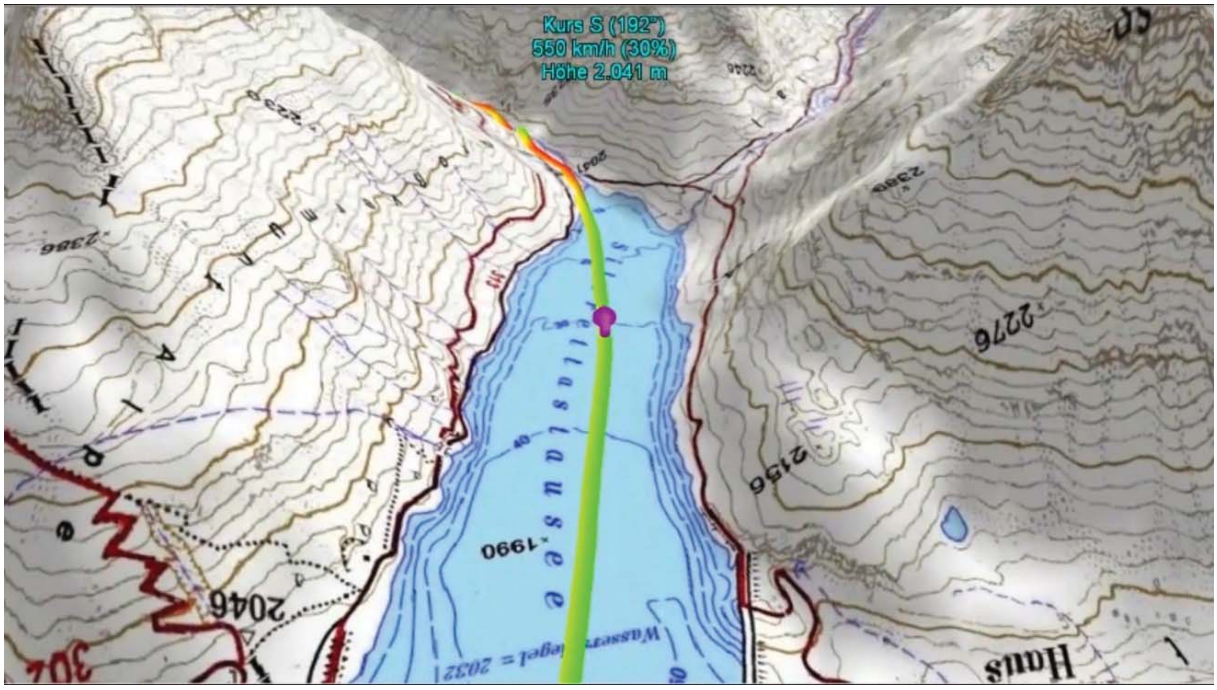

Figure 5: Screenshot of a 3D animation of the Austrian Alpine Club Map displaying a ski touring route.

5.2 MAP AS A THEMATIC INFORMATION CARRIER

As previously mentioned most avalanche relevant issues that deal with risk assessment have a spatial reference. For examples the regional danger levels, temperature distribution or the location of current avalanche events are amongst other topics that are being addressed and communicated regularly by the Avalanche Warning Services. Since domain experts have recognized that spatial representations have proven to be extremely efficient, it is obvious to integrate the produced maps in video clips in order to communicate this information to the public. However to enhance such static depictions within the communication process the use of pseudo dynamic methods such as animated progressive sequencing is promoted. These maps consist of text, area, line and point related information that can be projected on a topographic base map utilizing animation effects to produce pseudo dynamic effects.

5.3 MAP AS AN ESTHETICAL DESIGN FACTOR

Maps claim, among other things, to be carriers and promoters of esthetics (Spiess 2002: 14). Thus maps can be altered in video clips to enhance design topics instead of primarily emphasizing on navigational and orienteering issues. The following example underlines this approach showing the logo of the Austrian Alpine Club in the foreground with a contour line map in the background implying indirectly navigational competence.

Figure 6: The contour lines serve as a design element.

6 AVALANCHE CENTERS AND MODULE EFFICIENCY

In order to understand the effective usage of the above described container modules five Avalanche Warning Centers worldwide (Switzerland, Norway, New Zealand, Canada and USA (AWS 2016)) that have been identified to have active video clip communication in their portfolio were evaluated and compared. In the investigation three points were critically examined and analyzed to outline communication efficiency of video clip usage. First, the availability and accessibility of information was evaluated, where the video clips can be found on the web and how they are presented. Secondly, the components were verified how timely the issues are and what topics were given priority. Finally the qualitative implementation of the AIDA principles was analyzed. All evaluated Avalanche Warning Centers reveal spatial information even though the effectiveness of communication is to some extent ambivalent. The comparison in Table 1 shows that the amount of modules is not crucial for efficient communication. Although three Avalanche Centers (Utah, Canada and New Zealand) use more or less the same number of modules a clear distinction between them can be determined.

Table 1: The used modules for each Avalanche Warning Service. Blue = primary module container, red = secondary module container.

AWS Switzerland	AWS Norway	AWS New Zealand	AWS Canada	AWS Utah/USA	modules
X	X	X	X	X	video
X			X	X	animation
	X	X			fixed image
		X	X	X	text/annotation
X	X	X	X	X	speech
X		X	X	X	sound/noise
		X	X	X	music
		X	X	X	intro
	X	X	X	X	title
	X	X	X	X	logo
			X	X	teaser
		X			map
	X	X		X	interview
		X	X	X	outro/credits

The Utah Avalanche Center realization is in comparison the most efficient due to the fact that the content is regularly updated and constantly adapted to the users' needs, however lacks map integration. The Canadian and New Zealand achievements are both favorable however still possess a high potential for effective spatio-temporal optimization. Both Swiss and Norwegian only represent basic features and do not fully coincide with the described basic container-module framework.

7 COMBINATION OF MODULES AND AIDA

To increase the efficiency of geo-relevant communication in video clips as mentioned above it is necessary to focus on the selection, implementation and combination of the above specified modules. The AIDA concept serves here as a framework that can be also understood as an empty container that is filled subsequently with content. Therefore, through the combination of geo-communication utilizing the conceptual approach of storytelling together with selected modules desired results can be achieved.

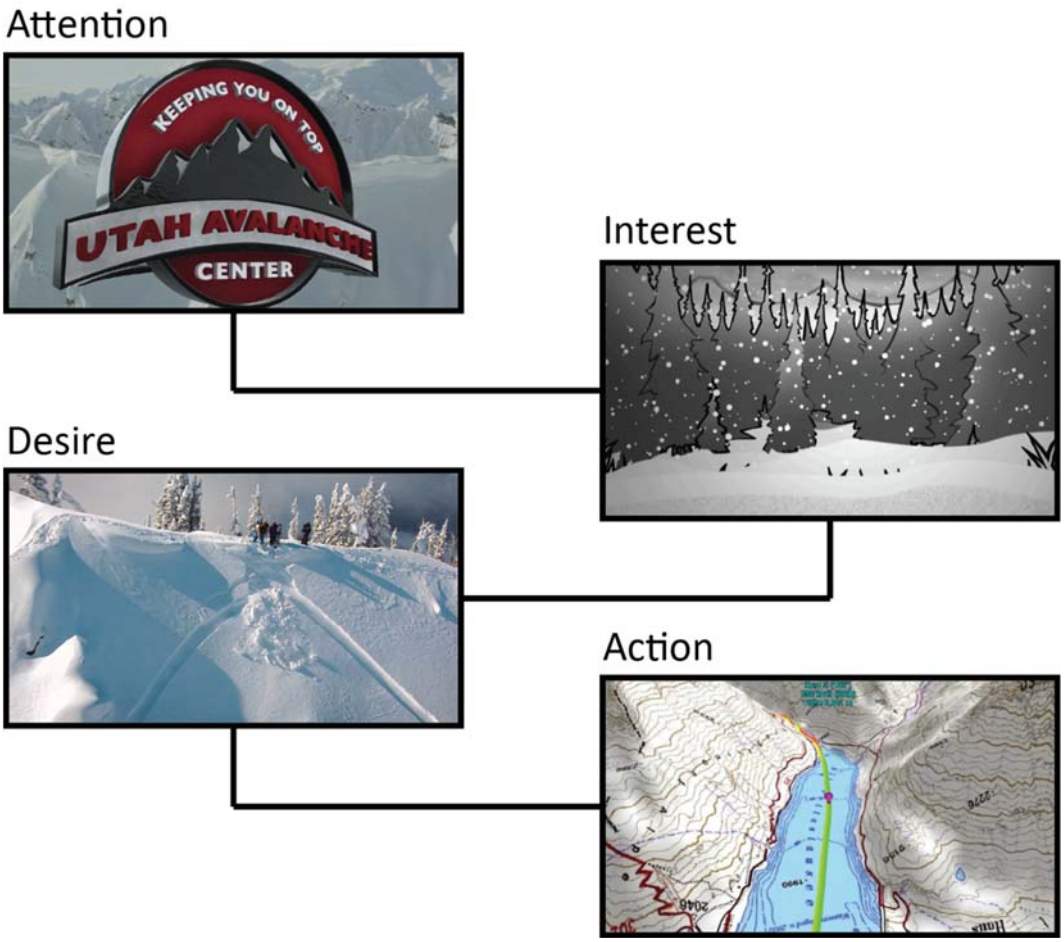

Figure 7: Combination of the four AIDA principles implemented with different modules.

The intro of the Utah Avalanche Center is predestined for the AIDA principle *Attention* due to the eye-catching effect of the logo. The animation of the weak layer development within a snowpack of the Canadian Avalanche Warning Service can be used for the AIDA principle *Interest* to arouse curiosity as well as to communicate specialized knowledge to the public. The AIDA principle *Desire* gives the viewer a reference to reality through a video sequence of

an avalanche event. Finally a map with an active proposal to go outdoors is connected to the AIDA principle *Action* to animate the user to transfer theory into praxis.

The entire process of choosing the right and meaningful modules within the AIDA framework demands a lot of skill and know-how so that ultimately a video clip is produced that can satisfy the ambitious objectives of effective geo-communication. The approach also foresees to simplify the process whereby a semi-automatic procedure is pursued.

8 MODULAR SYSTEM

The approach that has been described above is based on a system that is currently being developed and is established on three guiding principles: the *Combination of Modules, Interchangeability* as well as *Semi-automatic Usability*. This system however requires the creation of predefined containers as well as the availability of suitable video-editing software. Furthermore it also houses templates for recurring standard settings such as *Weather, Current Situation, Accident Investigation or Facts Worth Knowing*. Depending on the situation predefined templates can be used to take advantage of the structure whereby the content is simply replaced. Within the project, all video sequences are defined in distinct entities, whereby in principle the objects can be replaced with new ones. There are blocks consisting of a video and audio track and are thus ready for use, but there are also those that need to be redesigned for each new video clip. Thereby, further steps are necessary to accept attributes and effects of previous sequences and exchange them with new ones. This step is software dependent and must be done proactively. The more complicated the sequences are the more steps need to be actively carried out by the user. Simple, already ready to use modules accelerate the video production process keeping however in mind that repeating the same scheme too often with little variety makes the video clip dull and boring and thus losing the suspense factor.

The modular system can be regarded as a semi-automatic procedure. It accelerates the video production process and reduces the storytelling prerequisites to accomplish efficient geo-communication.

9 CONCLUSION

The problems of inefficient communication of geo-relevant issues to the general public have been recently addressed by the Consortium of the Austrian Avalanche Center (ARGE – Lawinenwarndienste Österreich 2015: 260) and have led to a broad discussion amongst experts. The approach in this article pursues these objectives and tries to show how to combine geo-relevant issues with the AIDA concept utilizing the communication channel video clip as a suitable form of new media integration. The combination exists of video clips that transport geo-relevant topics as well as the AIDA concept that broaches the issue of emotions by means of storytelling.

A semi-automated prototype system was implemented in the winter season 2014/15 at the Avalanche Warning Service Tyrol to test the proclaimed procedures. Predefined templates such as *Weather, Current Situation, Accident Investigation and Facts Worth Knowing* were accessible for selection and for further processing. This way previously defined and designed modules could be easily reused and ultimately replaced.

Although the production of video clips with only basic knowledge is possible the system is not yet implemented for operational use. Whether avalanche prevention can actually be enhanced with this system remains open, due to the fact that no analysis has yet been undertaken to explore the effectiveness of the system. Nevertheless, it can be assumed that the value and use of such a system will gain relevance in the near future.

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FIGURES