

Redesign of Slovenian Avalanche Bulletin

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ABSTRACT

We present the redesign of the Slovenian avalanche bulletin, published regularly during the winter season to warn against avalanche danger and to provide specific information for advanced users. The former version included an estimation of danger on a scale from one to five with supporting text for the whole country, while the new one offers an additional graphical description, specified for several geographical regions. The redesign profoundly influenced the work of avalanche forecasters by introducing a new interface, additional input and database storage. At the same time, users welcomed the additional information, international comparability and user friendliness of the new bulletin.

Categories and Subject Descriptors

D.3.3 [Information interfaces and presentation (e.g., HCI)]: Miscellaneous

General Terms

Design, Standardization

Keywords

Avalanche bulletin; official warnings; risk communication; danger awareness; usability testing

1. INTRODUCTION

Depending on the snow and avalanche situation, avalanche bulletins are issued for the majority of the planet's mountainous terrain. Their purpose is to warn inhabitants and visitors of avalanche-prone areas of the current estimated danger and to provide them with additional information (e.g. type of avalanche, reason for triggering). As winter mountaineering and ski touring become more mainstream, they are increasingly accessible to less experienced people, whose lack of knowledge and skills can result in injury or death. Therefore, there is an increasing need for user-friendly, easily understandable warnings with a clear message of the dangers one is exposing himself to when visiting avalanche-prone terrain [1].

The avalanche warning services in Europe have followed this need (in accordance with their varying resources) by upgrading their bulletins [2, 3] and by agreeing on an international set of icons for danger level and avalanche situations [4].

The Slovenian Environment Agency publishes avalanche bulletins regularly throughout the winter season [5]. These are the official warnings for the entire Slovenian area. To improve service and adhere to international standards, a complete redesign of the bulletin was undertaken in winter of 2015/2016 with the new

bulletin issued in test phase in the beginning of April 2016. The results from the test phase and user feedback will be used for additional improvements for the winter season of 2016/2017.

2. BULLETIN BEFORE REDESIGN

Before the redesign, the bulletin consisted of the danger level for the next few days and accompanying text describing in detail the snow conditions and danger situation along with the forecast for the next few days (Fig. 1).

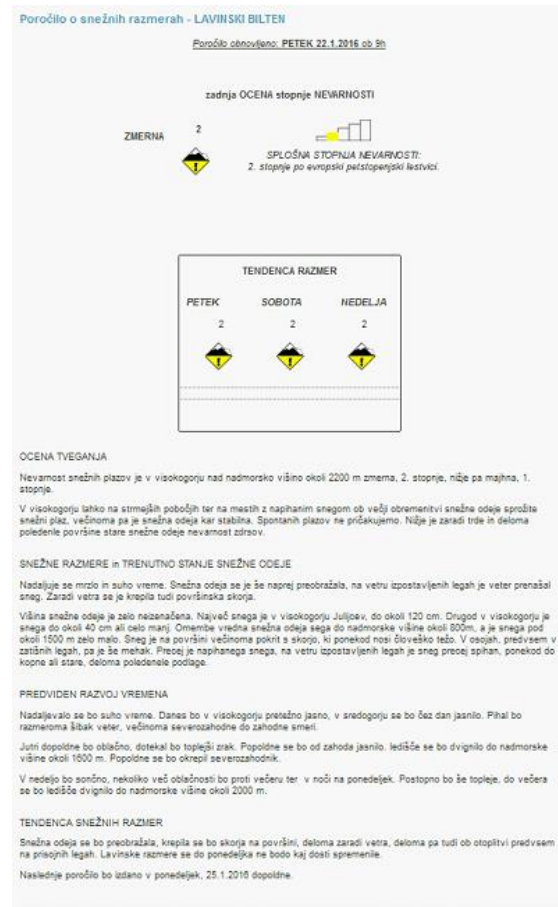


Figure 1: Bulletin before redesign

Although the text itself is very informative, usability testing indicated that it is more favored among experienced users, while novices have trouble comprehending the content due to lack of avalanche knowledge and experience. This predominantly textual form is also difficult for analyses and comparisons with previous seasons and other avalanche services from neighboring countries.

3. REDESIGNING THE BULLETIN

The **first step** of the redesign was an extensive study of other European avalanche bulletins as well as the bulletins on other continents, to find examples of good practice and examples of visualization options.

In the **second step**, the extent of the information to be presented in the new bulletin had to be decided. The bulletin needed to be as informative as possible while avoiding information overload and balancing the resources needed to provide the data, e.g. data availability and human resources needed to process the data.

Based on the agreed extent of information, several drafts of the new bulletin were prepared and user tested on several target groups.

To reach a final decision, we considered guidelines from previous work analyzed in step one with the addition of an online survey and usability testing based on initial paper prototypes (Fig. 2 - 4).

Lavinski bilten

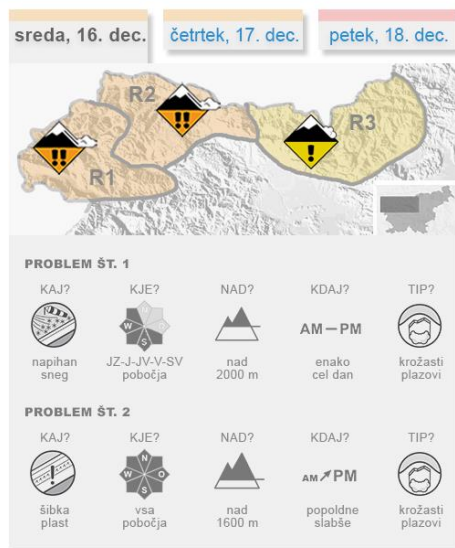


Figure 2: Graphical part of prototype no.1

Lavinski bilten

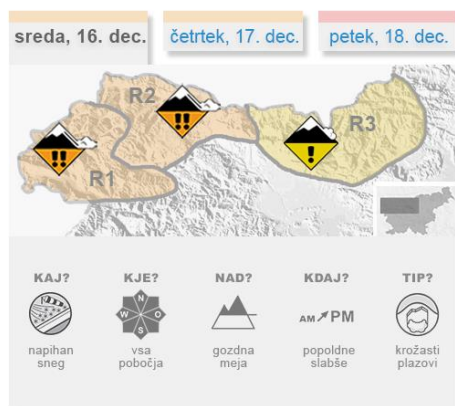


Figure 3: Graphical part of prototype no.2

Lavinski bilten

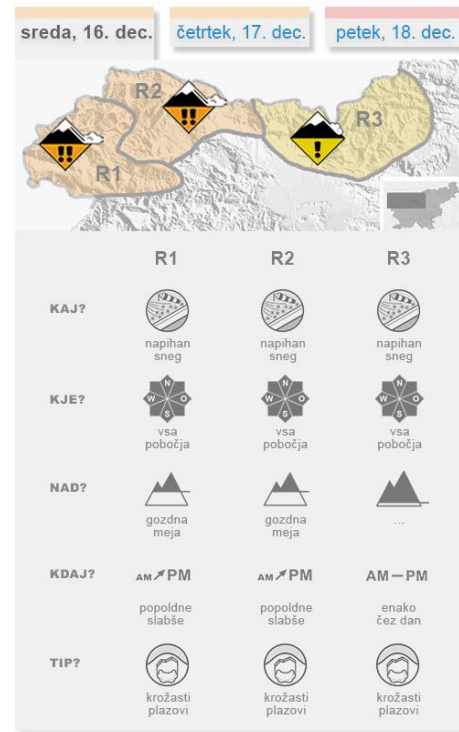


Figure 4: Graphical part of prototype no.3

User testing showed that users prefer prototype no. 3 because it presents the information for each region separately, although the table was not understood by everyone. Prototype no. 1 was confusing because it shows two problems at the same time while prototype no. 2 was well accepted. Therefore the new design is a modified prototype no. 2 with the possibility to select a particular region.

Other findings included:

- More experienced users rely more on the textual part and decide on the danger level themselves, while for novices the danger level is the most important information;
- The name “avalanche bulletin” does not stress enough that this is a warning against danger, particularly to novices;
- The danger level for the following days is not clearly presented;
- The entire scale for danger levels should be presented and the icons should also be numbered from 1 to 5;
- Regions should be named with proper names, not R1 – R3;
- The weather forecast is a useful piece of information, although it is not a always part of similar bulletins.

Based on usability testing, a near-final version was designed with the final set of information to be included in the bulletin. This was the necessary input for the third step.

The **third step** was to design a new database and interface to support forecasters' new workflow (Fig. 5). The interface was tested internally with the forecasters to achieve a user-friendly and effective design.

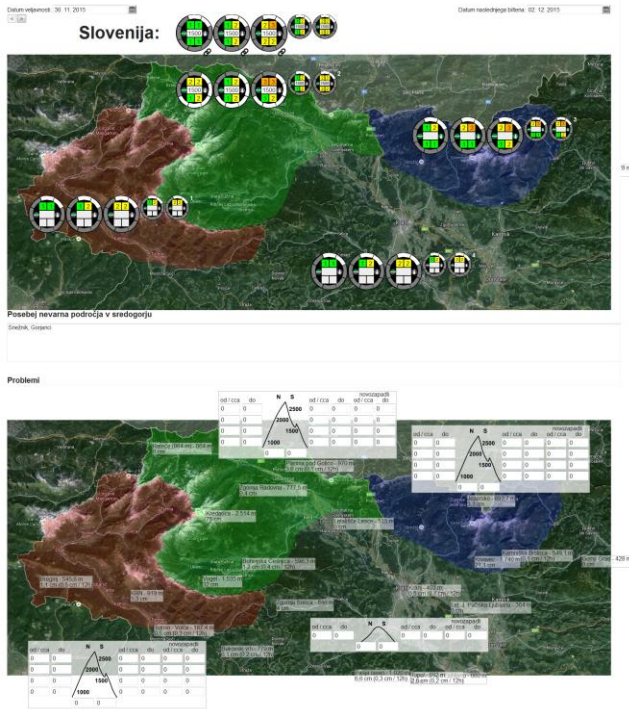


Figure 5: Two screenshots of the new interface for data input

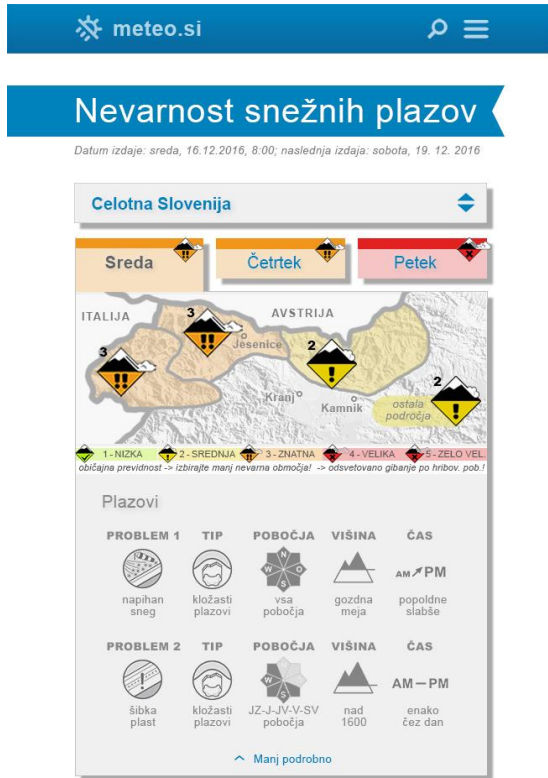


Figure 6: Redesigned bulletin – more details in graphical part



Opis stanja in napoved (na dan 16. 12. 2016)

PODATKI O SNEŽNI ODEJI

2000 m	50-80 cm	40-70 cm	50-60 cm	
1000 m	20-50 cm	30-40 cm	20-30 cm	20-30 cm
	J in Z Julijci	Osrednji Julijci in Z Karavanke	Kam.-Sav. Alpe in V Karavanke	Ostala območja

SPLOŠNA STOPNJA NEVARNOSTI

3. stopnja po Evropski petstopenjski lestvici - ZNATNA. Zaradi napihanega snega, zametov in šibkih plasti v stari snežni odeji.

OCENA TVEGANJA

Nevarnost je večinoma 3. stopnje, lokalno predvsem pod gozdno mejo 2. stopnje. Snežna odeja je potencialno še vedno precej nestabilna in slabo sprjeta s podlago. Snežni plaz lahko marsikje sprožite že ob manjši obremenitvi snežne odeje. Še posebej nevarna so strmehjša pobočja ter mesta z napihanim snegom.

SNEŽNE RAZMERE

V ponedeljek je bilo v gorah delno oblačno, pihal je okrepljen severozahodnik. V torek je bilo zmerno oblačno, padlo je nekaj cm suhega snega. Novi zameti so nastajali predvsem v ponedeljek na vzhodnih in južnih straneh grebenov in prelazov. Temperatura je bila ves čas pod ničlo. Snežna odeja se je počasi sesedala, le malo preobrazala in slabo sprejemala s staro snežno odejo. Snežna odeja je suha, v zatišnih legah mehka, na vetru bolj izpostavljenih legah tudi skorjasta. Veliko je zametov in kloč, ki so labilne – ležijo na goli ali poledeneli kopni, predvsem v višjih legah tudi na stari skorjasti snežni podlagi. Grebeni so marsikje precej spihani, ponekod trdi ali celo poledeneli. Na nadmorski višini 2500 m je snega okoli 180 cm, na 1500 m do okoli 100 cm, na 1000 m od 30 do okoli 60 cm.

- Poročila s terena

PREDVIDEN RAZVOJ VREMENA

Prevladovalo bo oblačno in megleno vreme z občasnim sneženjem, ki se bo v četrtek popoldne okreplilo in oslabilo šele v noči na soboto. Temperatura bo ves čas pod ničlo. Do sobote lahko zapade od 30 do 50 cm snega, lokalno tudi več. Proti vzhodu, predvsem na Pohorju, bo novega snega lahko tudi okoli 1m! Pihal bo veter vzhodnih smeri, najmočnejši bo v četrtek popoldne in v petek, ko lahko v visokogorju preseže 70 do 80 km/h.

- Podrobnejša vremenska napoved

TENDENCA SNEŽNIH RAZMER

V naslednjih dneh bo tveganje zaradi novega snega naraslo! Prirast snežne odeje in zameti zaradi vetra bodo do sobote postopno povečali nevarnost – tako v gorah kot tudi v sredogorju ter celo gručevnatem svetu predvsem vzhodne Slovenije. Ob novih izdatnejših snežnih padavinah pričakujemo tudi spontano proženje majhnih in srednje velikih plazov s strmehjših pobočij. Plazji se bo novi sneg po stari, skorjasti oz. trdi podlagi.

DODATNE INFORMACIJE

- Arhiv biltenov
- Biteni drugih držav
- Nasveti za varnejše gibanje
- Razlaga bitena in ikon

Figure 7: Redesigned bulletin – less details (main view)

The *fourth step* was to achieve further improvements by asking stakeholders (mountain rescue service, mountain guides, alpine association etc.) for comments on the near-final version.

The bulletin was issued in the new version for a test period in the last part of winter. The *next steps* will include fine-tuning based on the evaluation of the test period in terms of user acceptance and impact on the forecasters' workflow.

4. BULLETIN AFTER REDESIGN

The new bulletin (Figs. 6 and 7) puts more emphasis on graphical information for easier comprehension. The graphical content is presented for four geographical regions for the current and next two days. The avalanche situation is graphically explained with international icons (e.g. type of avalanche) and additional custom made icons (e.g. change of danger within the day). The new bulletin is more comparable to bulletins from other countries, which makes comprehension easier for foreigners as well as for Slovenians going abroad.

5. IMPACT OF THE REDESIGN

For the **Slovenian avalanche service**, the most important achievement is the improvement in the quality of their service when informing and warning the public. Additionally, the new database with more numeric information enables easier analysis of the season and the performance of the service as well as improved comparability with other services. The new interface was designed so that the number of geographical regions can be easily changed should the service decide for more (or less) detail. Similarly, the number of parameters can also be modified, making the bulletin adjustable. Although not yet in use, the data is prepared with improved dissemination in mind (xml format, widget). The presented graphical information also enables automatic translation of a large part of the information to other languages, which also remains to be implemented.

For **users**, easier dissemination and easier understanding mean increased awareness and consequently improved safety. This is particularly true for novices who had difficulty understanding the content of the previous bulletin. In the survey conducted after publishing the new bulletin in the test period, none of the 69 participants described the new bulletin as worse than before and the majority of users (65%) agreed that the bulletin has been significantly improved.

6. REFERENCES

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