

Enhancing Mine Rescue Communication Совершенствование горноспасательной связи

Focus FS & Tim Ebbinghaus, Ontario Mine Rescue
IMRB 2017

September 5, 2017



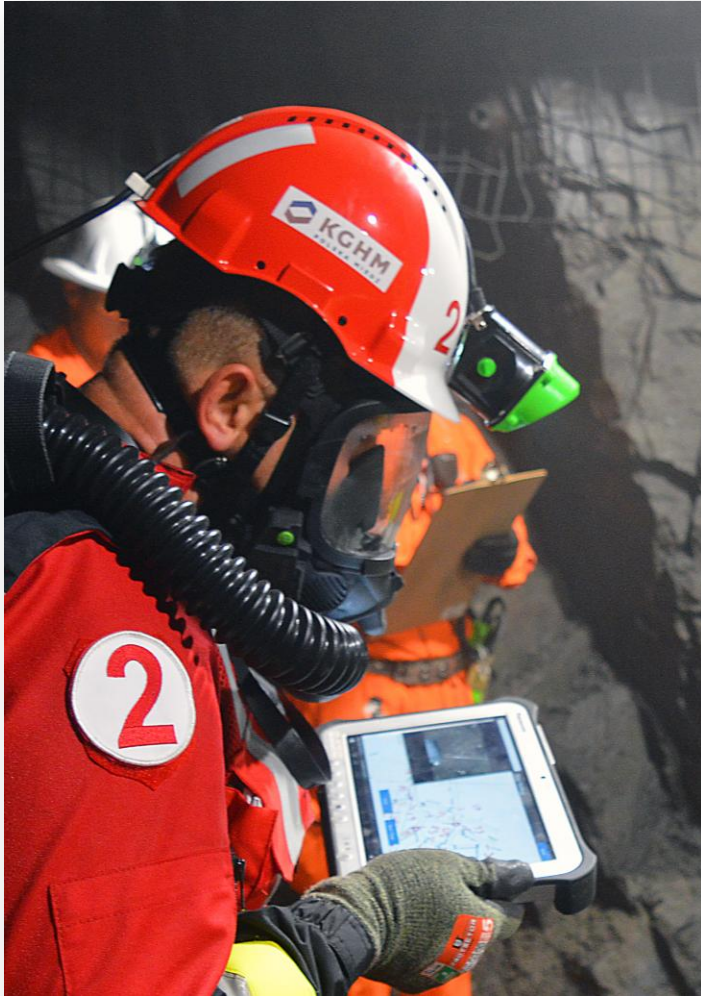
Focus FS
Building Smart Worksites



ONTARIO MINE RESCUE

Focus FS
Building Smart Worksites

Enhancing Mine Rescue Communication Совершенствование горноспасательной связи



1. Focus FS & Ontario Mine Rescue

2. Communication Challenges

Проблемы связи

3. System Overview

Системный Обзор

4. Mine Rescue Experiences

Опыт ведения горноспасательных работ

5. System Status

Состояние системы

6. Questions

Вопросов

About The Developer

О разработчике

Focus FS

- **Software company focused on industrial sector, mining**

Компания по разработке программного обеспечения, ориентированная на промышленный сектор и добычу ПИ

- **Leverage today's digital/internet technologies to reduce risk profile and increase efficiency**

Использование современных цифровых / интернет-технологий для снижения профиля рисков и повышения эффективности

- **Systems focus on the safety and integrity of your people, processes, and things**

Системы сосредоточены на безопасности и целостности ваших людей, процессах и вещах

About Us...

О нас

Ontario Mine Rescue

- **Creates, administers and evaluates mine rescue training and standards in Ontario**
Создает, администрирует и оценивает обучение и стандарты по спасению мин в Онтарио
- **Since its creation, OMR has been internationally lauded for its commitment to high standards in training, equipment and emergency response programs and industry leading mine rescue programs**

С момента своего создания OMR получила международное признание за приверженность высоким стандартам в области обучения, оборудования и программ реагирования на чрезвычайные ситуации и ведущих в отрасли программ по спасению

Communication Challenges in Ontario

Проблемы связи в Онтарио

- **Radio-only communication**

Радиосвязь

- **Lack of visuals**

Отсутствие визуальных эффектов

- **Paper maps**

Бумажные карты

- **Pen and paper notes**

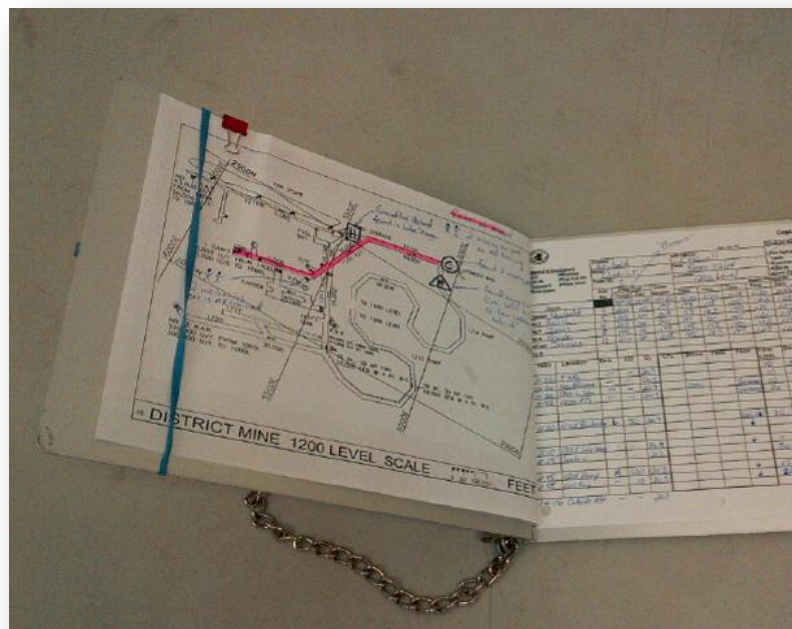
Ручка и бумажные заметки

- **Handover to another team**

Передача в другую команду

- **Post incident & Legal Record**

Повествование об инциденте



Background История



- **System designed in consultation with Ontario Mine Rescue beginning 2015**

Система, разработанная при консультации с Горноспасательной службой Онтарио в начале 2015 года

- **Piloted at various mine sites, provincial competitions, and officially launched at International Mine Rescue Competition in 2016**

Экспериментировали на различных шахтных участках, провинциальных соревнованиях и официально выступили на Международных горноспасательных соревнованиях в 2016 году

Architecture Архитектура



- **Online and offline capability**

Возможность онлайн и офлайн

- **Runs on devices that communicate with each other**

Работает на устройствах, которые общаются друг с другом

- **Automatic updating of maps**

Автоматическое обновление карт

- **Designed user interface for optimal operation in:**

Разработанный пользовательский интерфейс для оптимальной работы в

- **Dim to dark settings**

Параметры от темноты до темноты

- **Smoke presence**

Наличие дыма

- **Large buttons for gloves / fat-fingers**

Большие кнопки для перчаток / жировых пальцев

System Overview

Системный Обзор



- ✓ **Equipment inventory and checks**
Инвентаризация и проверка оборудования
- ✓ **Oxygen levels and time under oxygen with alerts**
Уровни кислорода и время под кислородом с оповещениями
- ✓ **Digital maps for the entire mine**
Цифровые карты для всего рудника
- ✓ **Photo capability**
Возможность фото
- ✓ **Notes and actions that are timed**
Примечания и действия, которые синхронизируются
- ✓ **Post-incident reports**
Отчеты о происшествиях
- ✓ **System modes available: Live-incident, training, competition**
Доступны системные режимы: Live-инцидент, обучение, соревнование

Shift Rescue

Captain's Equipment

Back

Standard List | Auxillary List

MX6 Gas Monitor	0
SSR 90M (Team Unit)	0
First Aid Kit	0
Kestrel	0
Chalk/Paint	0
Probe Stick	0
Whistles	0

Save

Jan 31 2017 | 11:39:26 | Connected to internet

Shift Rescue

Captain's Equipment

Back

Standard List | Auxillary List

Fire Fighting Hose	0
Tools	0
Communications	0
Carevent	0
Other	0
BG4	0
Basket/Stretcher/KED	0
Level Plans	0
SSR 90M (RESCUE UNIT)	0
Fire Fighting Nozzle	0

Save

Jan 31 2017 | 11:40:15 | Connected to internet 237 ms

Shift Rescue

Captain's Report (Design001)

Back

Time	Captain	No.2	No.3	No.4	V/Captain	No.6
11:47	200	198				04

Next Reading
10:52
Time Under O2: 00:00:09:09

Finalize Report

O2 Note

View Maps

Oxygen Usage

Time: Jan-31-2017 12:44

Captain: 170

No.2: 171

No.3: 174

No.4: 173

V/Captain: 120

No.6: 173

Cancel Next

Time	Location	Smk	CO	O2	CH4
12:40	Sample				

Destination/Report Edit

Jan 31 2017 | 12:45:17 | Connected to internet 99 ms

Shift Rescue

Captain's Report (Design001)

Back

Time	Captain	No.2	No.3	No.4	V/Captain	No.6
11:47	200	198				04
12:45	170					

Next Reading
19:56
Time Under O2: 00:00:09:23

Finalize Report

O2 Note

View Maps

O2 Pressure Oxygen Usage

Legend

- Captain
- No.2
- No.3
- No.4
- V/Cap
- No.6

Ok

Time	Location	Smk	CO	O2	CH4
12:40	Sample				

Report Edit

Jan 31 2017 | 12:45:31 | Connected to internet 99 ms



Captain's Report (MR Test 001)

[Back](#)

Time	Captain	No.2	No.3	No.4	V/Captain	No.6
16:03	200	198	203	196	201	205
16:07	195	190	191	192	189	193
16:20	180	178	182	189	177	186

Next Reading

19:54

Time Under O2: 00:00:16:49

[Finalize Report](#)[O2](#)[Note](#)

Time	Location	Smk	CO	O2	CH4	Doors	Fans	Flow	Time Limit	Destination/Report	Edit
16:04	150 Level	M	-	20.9	-				10	Level 150 location of fire	Edit
16:06	150 Level	-	-	-	-				10	Fire located on Main Ramp 114 OB	Edit
16:11	Main Ramp	H	-	20.9	-					Fire located between 4520 ACCESS and 4530 ELEC SUB STN	Edit
16:12	Main Ramp	-	-	-	-				11:52	20 minutes, fight fire	Edit



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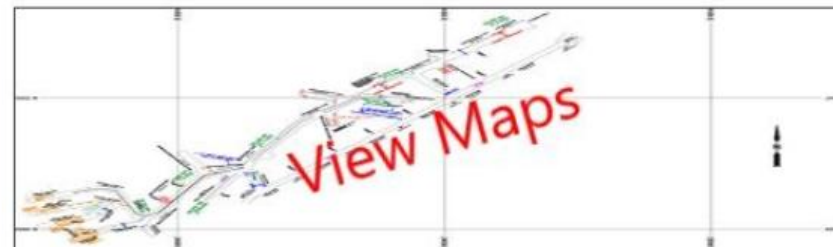
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[Finalize Report](#)[O2](#)[Note](#)

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Briefing Officers Report (MR Test 001)

[Back](#)[Finalize Report](#)[Note](#)

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16:12	Main Ramp	-	-	-	-				20	20 minutes, fight fire	Edit
16:21	Main Ramp	-	-	-	-					Fire extinguished	Edit
16:22	4530	L	-	20.9	-				01:49	Two men reported in refuge at 4380 #3 - Telephone services. Reported ok. Locate and bring to surface	Edit
16:25	4380 #3 RS	-	-	20.9	-					2 men located in RS. Both responsive. Breathing apparatus provided. Bringing to surface.	Edit



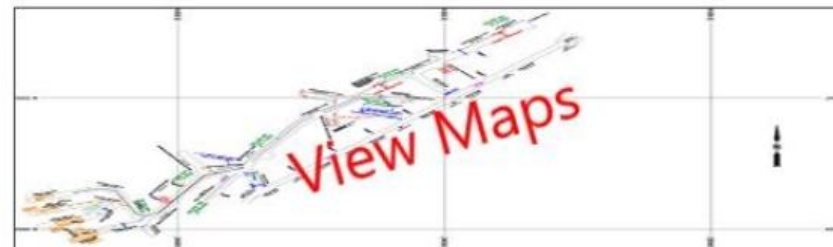
Briefing Officers Report (MR Test 001)

[Back](#)[Finalize Report](#)[Note](#)

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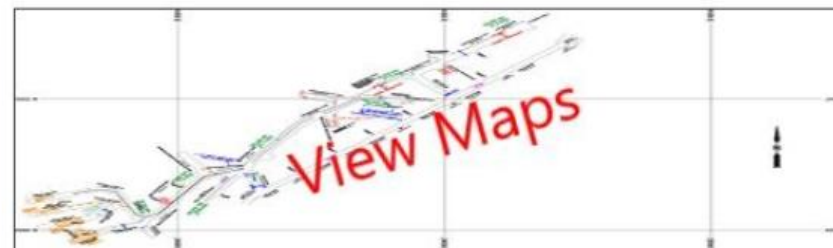
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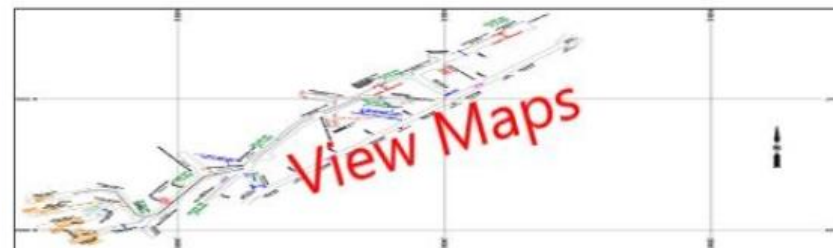
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[Back](#)[Finalize Report](#)[Note](#)

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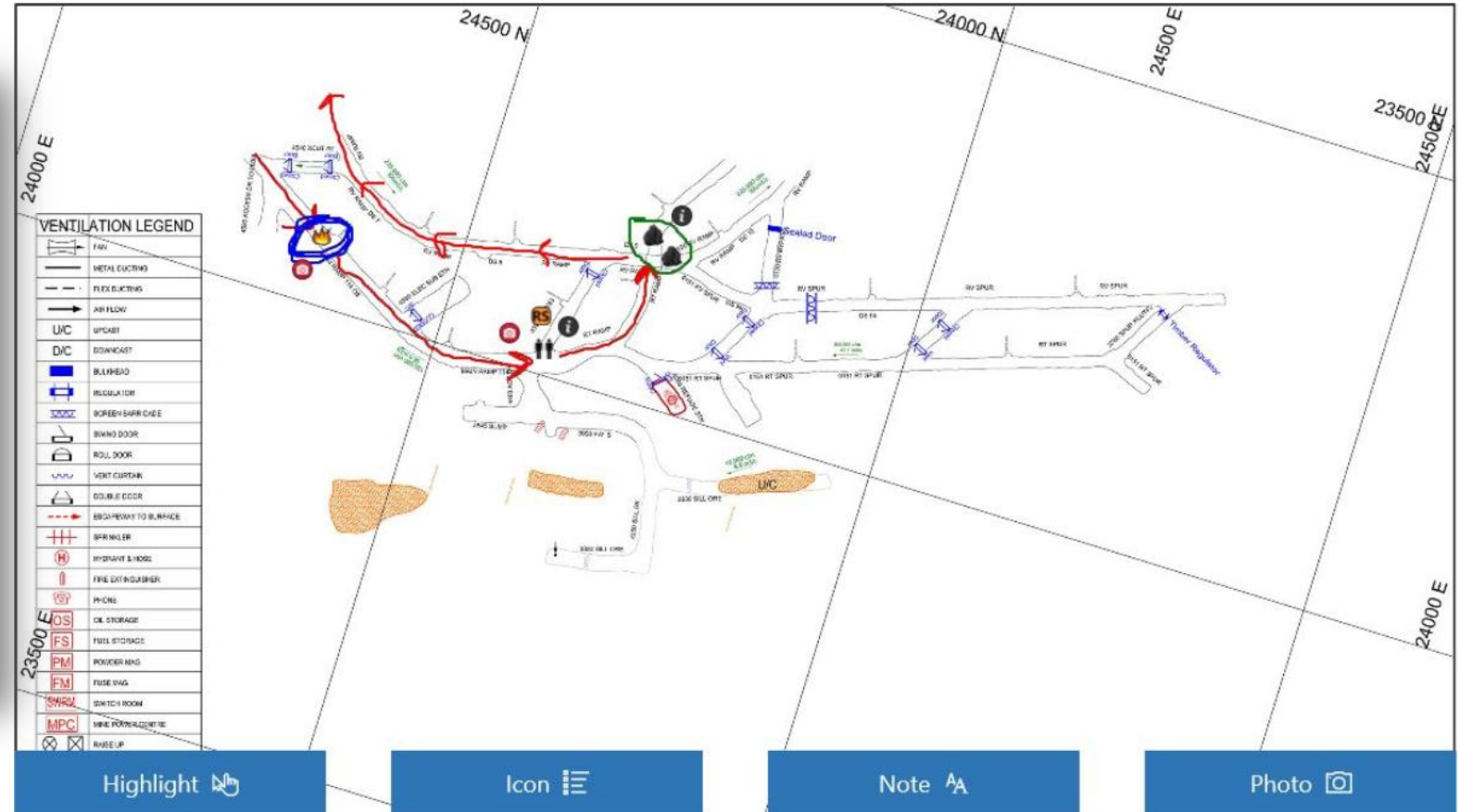
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[Back](#)[Finalize Report](#)[Note](#)

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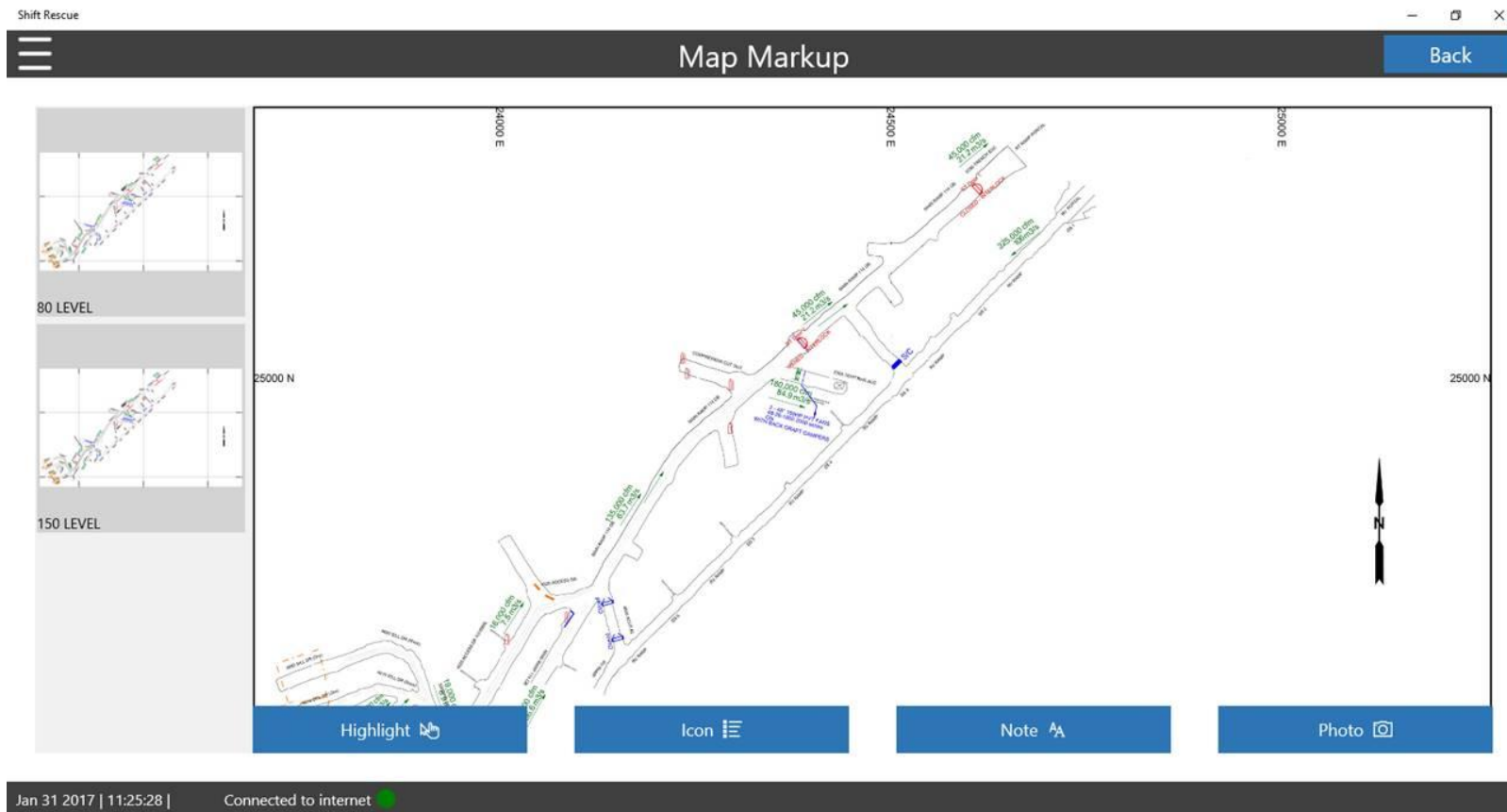
Experiences

ОПЫТ



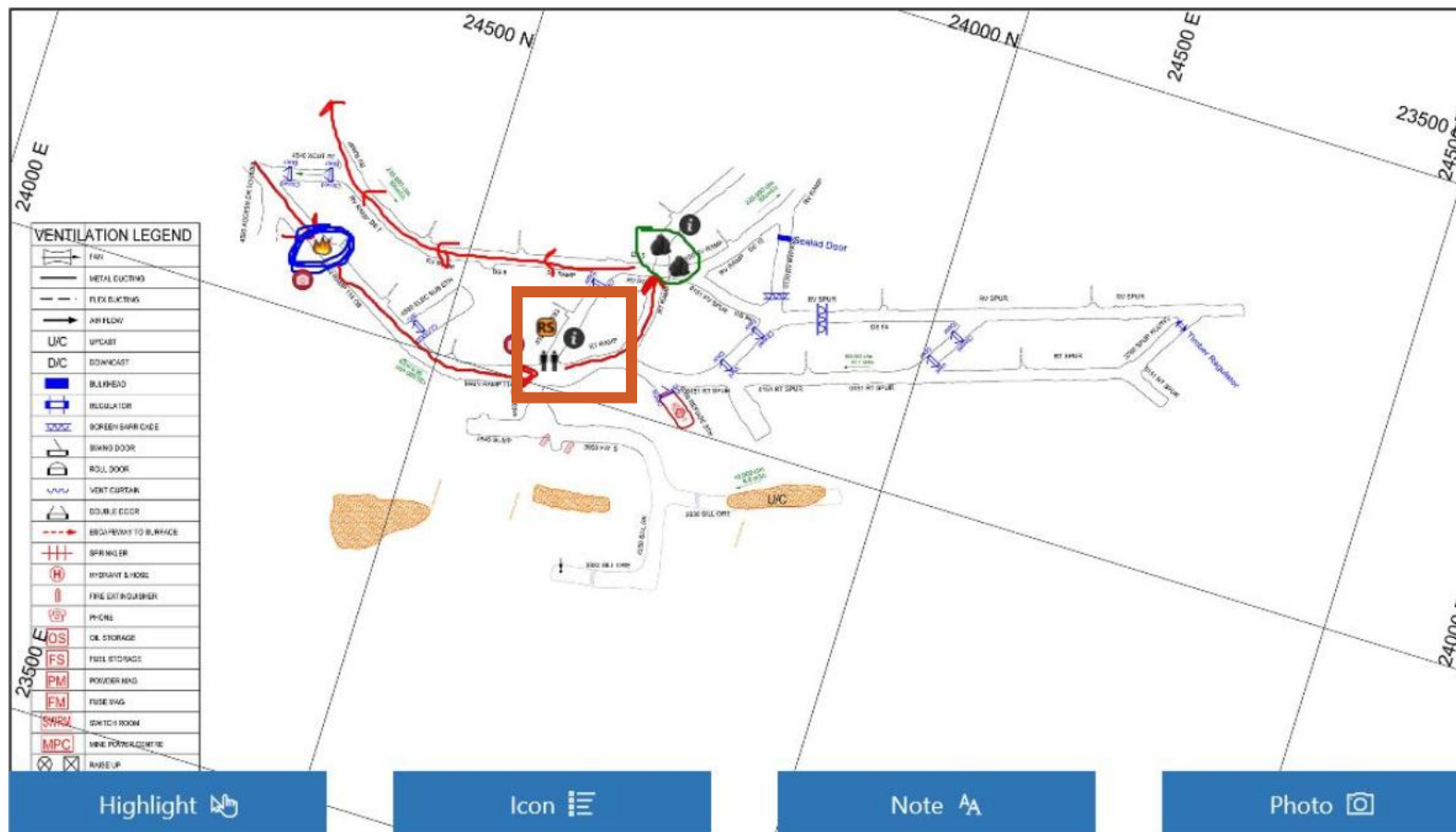
During incident briefing, BO uses digital map to illustrate where they wanted team to proceed, Captain referred to map on their tablet

Во время брифинга инцидентов ВО использует цифровую карту, чтобы проиллюстрировать, где они хотели, чтобы команда продолжалась, капитан сослался на карту на своем планшете



Captain feedback: *“The digital maps alone is a big improvement over paper maps. I can quickly scan through maps including maps of ground above and below where we are.”*

Ответ капитана: «Одни только цифровые схемы - это большое улучшение по сравнению с бумажными. Я могу быстро просмотреть схемы, включая схемы горизонтов выше и ниже, того где мы находимся».



Captain handed tablet to personnel located underground during incident, worker drew location where he last seen his partner. This assisted team in quickly locating injured worker.

Капитан передал планшет персоналу, находящемуся под землей во время инцидента, рабочий нарисовал место, где он в последний раз видел своего партнера. Это помогло команде быстро найти травмированного работника.



Briefing Officer requested better description of the scene where worker was injured; Captain sent a number of photos which better informed Briefing Officer.

Сотрудник брифинга попросил более подробное описание места, где был ранен работник; Капитан отправил несколько фотографий, которые лучше информировали брифинга.

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Finalize Report

O2

Note

View Maps

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Timers ensure Captain captures team O2 levels; data shared with BO

Таймеры гарантируют, что капитан фиксирует уровни команды O2; данные, совместно используемые с БО

N 1	Need to build barricade
N 2	Haulage truck (From Team #1)
N 3	Temperature reading is Dry: 33 degrees Celcius & Wet bulb : 25 degree Celcius
N 4	Gas check #4, CO : 1100, O2 : 19.5%, CH4 : 0, Light smoke
N 5	Tools an equipment to build barricade (vent tubing, wood, etc.)
N 6	No flow once barricade was built. Conditions are the same.
N 7	Gas clear
N 8	Barricade
N 9	John informed us that his partner was impelled by rebar in the RV Ramp DS 7. John will remain in the Refuge station (Refuge is considered a barricade due to having no phone)
N 10	Vehicle is secured.
N 11	Casualty name is Matt, Conscious with bolt going through his mid section.
N 12	Truck wasn't here as per Team #1 info.
N 13	Hydraulic spreader/cutter is at this location
N 14	Scoop damage the RV, but is secured.
N 15	Gear left behind: cutters, hose & nozzle, neck collar.
N 16	Matt's conditions at the scene; breath rapid at 24 breath per minutes, pulse strong at 82 beats per minutes. Matt's condition on route; 24 breath per minutes, pulse strong at 84 beats per minutes
N 17	Heat exposure limit stopped here, 64 minutes left out of the original 84 minutes.



- **Notes, photos, and equipment data used in post-incident report**

Данные для заметок, фотографий и оборудования,
использованные в отчете об инциденте после инцидента

- **Workflow allows for post-incident feedback from BO, Captain, MRO, and any other incident official**

Рабочий процесс позволяет следить за обратной связью от BO,
Captain, MRO и любого другого официального лица
инцидента



System Status

Состояние системы

1. System is deployment-ready

Система готова к развертыванию

2. Version 3.0 released in June-2017 which applied enhancements and feedback from teams and MRO's during IMRC

Версия 3.0, выпущенная в июне-2017 году, которая применяла усовершенствования и отзывы от команд и MRO в ходе IMRC

3. OMR vision

Видение OMR



Future Enhancements Будущие улучшения

Tablet to act as central control for:

- Wireless communication with gas monitor
- Wireless communication with breathing apparatus
- Wireless communication with vital sign monitoring devices



Future Enhancements Будущие улучшения

Устройство для центрального управления для:

- Беспроводная связь с газовым монитором
- Беспроводная связь с дыхательным аппаратом
- Беспроводная связь с группой пациентов с сердечным ритмом и температурными мониторами





Questions? Вопросы?

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