Mountain Safety Knowledgebase

Plenary Session ICAR 2016

ICAR STATUTES *(Extract)*

2. Purpose/Tasks

2.1 ICAR works as worldwide open platform for the exchange of mountain rescue knowledge.

ICAR in the past and today

- **Founded 1948**

Von links: Wiggerl Gramminger/Bayerische Bergwacht, unbekannt, Dr. Rudolf Campell/SAC, Karl Frantz/Bayerische Bergwacht, Mengin, Dr. Schmidt-Wellenburg/OeAV, Wastl Mariner/OeAV, Pinotti, Dr. Güttner, Prof. Felix Germain

- **ICAR 2015**

ICAR 2016

87 member organizations in 35 countries worldwide.

Topics Covered by the Mountain Safety Knowledgebase

- Safety, accident prevention and rescue in rock climbing
- Safety, accident prevention and rescue in ice climbing
- Safety, accident prevention and rescue in glacier travel
- Safety, accident prevention and rescue in canyons
- Safety, accident prevention and rescue in avalanche terrain
- Safety, accident prevention and rescue in cold environments
- Safety, accident prevention and rescue in caves
- Safety and accident prevention in alpine air rescue
- Mountain emergency medicine

Mountain Safety Knowledgebase

(Simplified sample of the database structure
Concept draft V 0.9, Manuel Genswein
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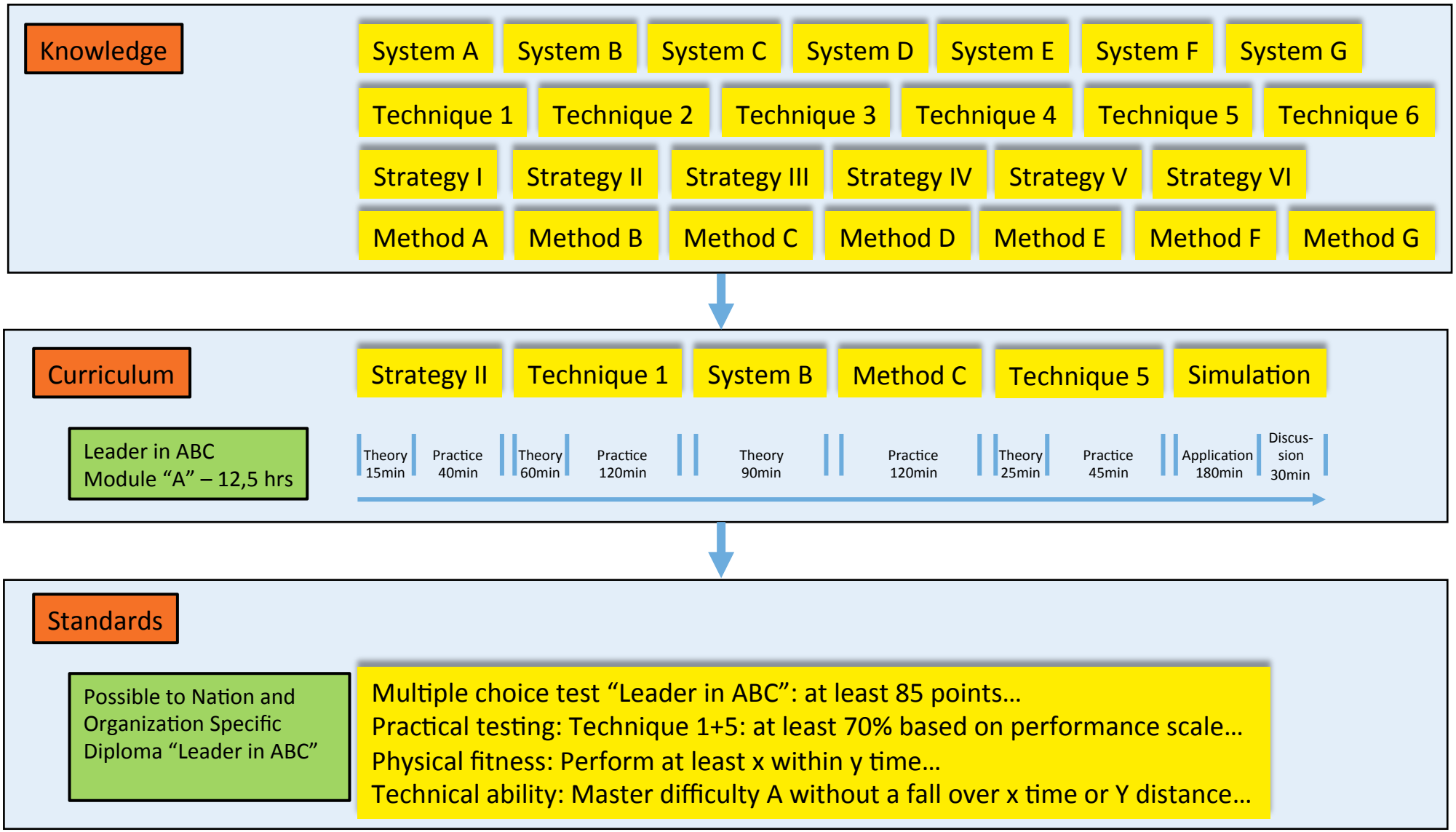

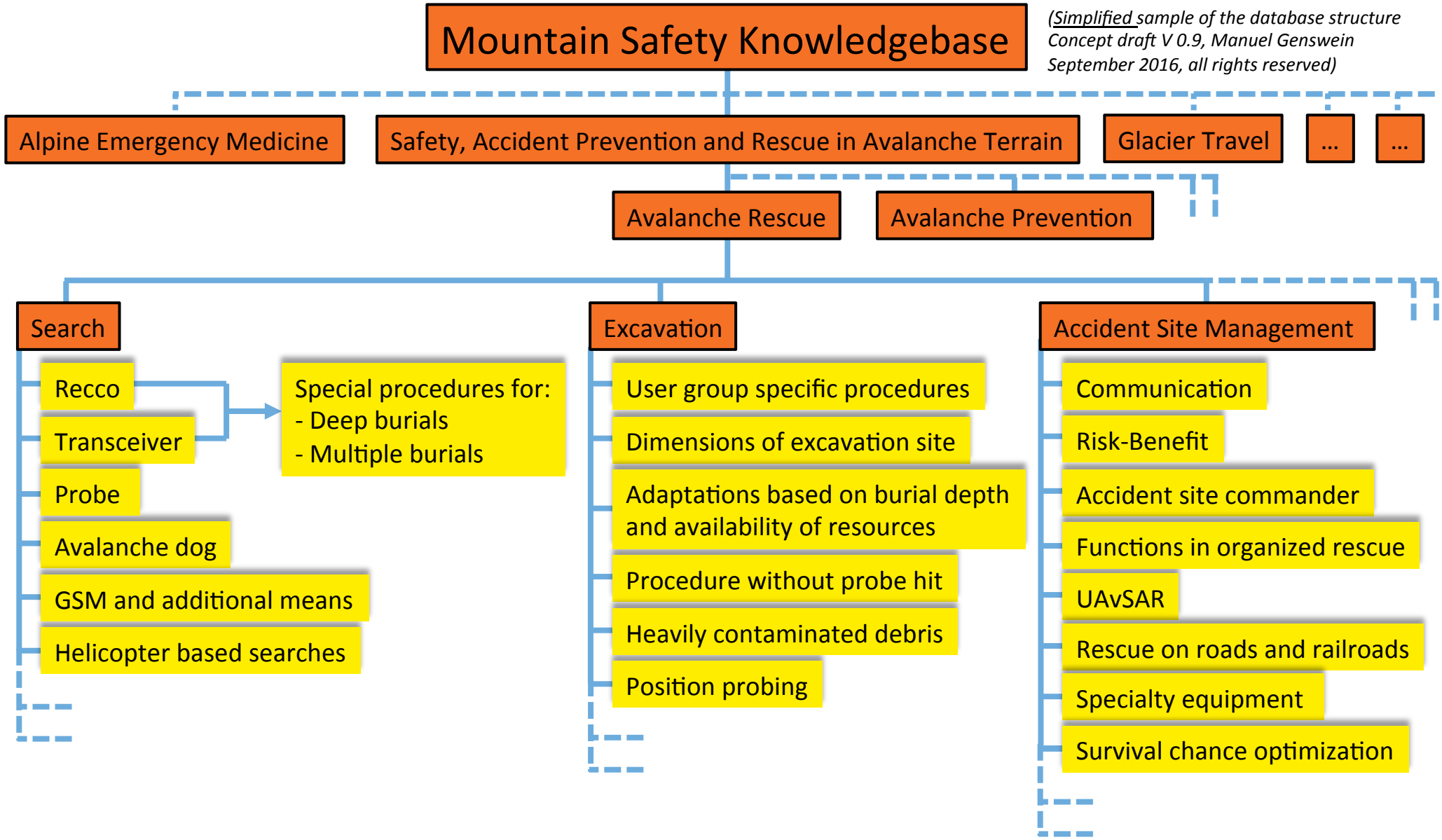
Mountain Safety Knowledgebase
(Simplified sample of the database structure
Concept draft V 0.9, Manuel Genswein
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Alpine Emergency Medicine
Safety, Accident Prevention and Rescue in Avalanche Terrain
Glacier Travel
...
...
Avalanche Rescue
Avalanche Prevention
Search
Recco
Transceiver
Probe
Avalanche dog
GSM and additional means
Helicopter based searches
Special procedures for:
- Deep burials
- Multiple burials
Excavation
User group specific procedures
Dimensions of excavation site
Adaptations based on burial depth and availability of resources
Procedure without probe hit
Heavily contaminated debris
Position probing
Accident Site Management
Communication
Risk-Benefit
Accident site commander
Functions in organized rescue
UAvSAR
Rescue on roads and railroads
Specialty equipment
Survival chance optimization

Mountain Safety Knowledgebase

Safety, Accident Prevention and Rescue in Avalanche Terrain

Avalanche Rescue

Search

Probing

Probe lines

Coarse Probing

Slalom Probing

(Simplified sample of the database structure.
Sample for one coarse probe line technique.
Concept draft V 0.9, Manuel Genswein
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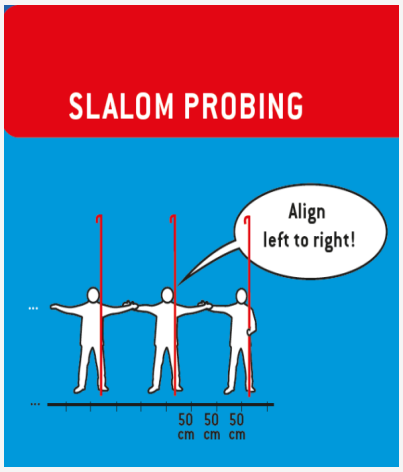
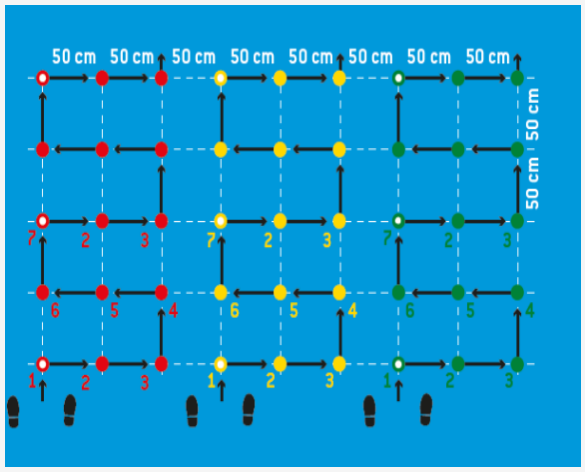
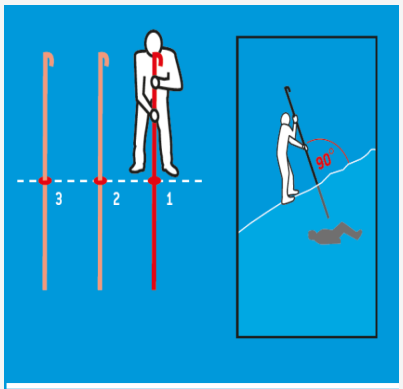






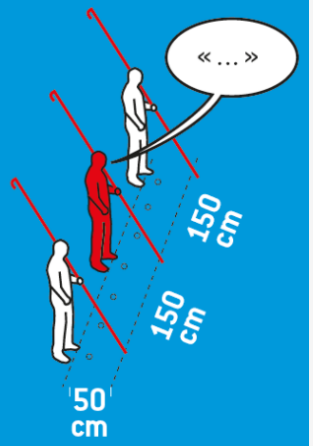
Probing depth: 1st passage 1.5m
2nd passage 2.5m

Offset: change order of rescuers in the line (random offset)

COMMANDS:
Commands are given by the probe line leader or a rescuer in the center of the probe line.

1: «probe»
2: «right»
3: «right»
4: «forward»
5: «left»
6: «left»
7: «forward»

As required:
«align left to right»
(Positions:)



Instruction Text:

Probe master is not required, at this stage it is often more efficient to use a rescuer in the middle of the probe line as improvised probe master.

The probing depth in the first passage is an optimization between:
"area search speed" (m2/rescuer/min)
"likelihood of survival / burial depth"
"percentage of buried subjects / burial depth"

After the first unsuccessful passage in coarse probing, apply it a second time.
A systematic offset of 25cm (1/2 grid width) is very difficult to maintain.
The offset of the grid for the second passage is more efficiently introduced by lining up the rescuers in another position in the probe line.
Every rescuer has a slightly different probing pattern which leads to a randomized probing pattern.

After a second unsuccessful application of course search, apply fine probing.
This must be done with a probe master and very strict marking.

Combine the search with dog teams as soon as possible: The scent cone has a better probability to reach the surface due to the perforation.
After fine probing in a strict manner, removal of the probed layers (1m safety margin to the unprobed debris) with a snow groomer should be considered.

Instruction Video:

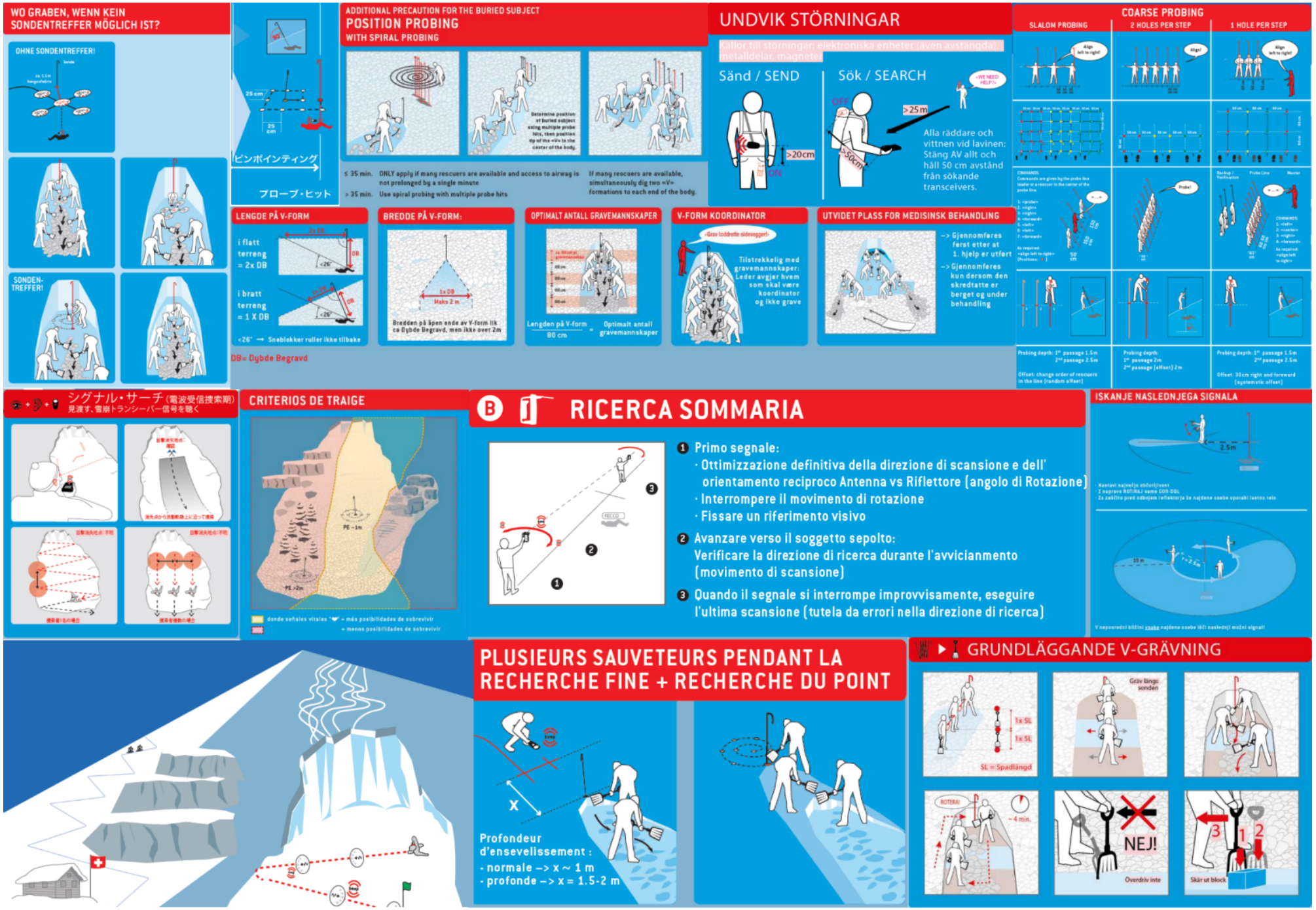
Scientific Paper:

Slalom Probing ISSW 2014 Genswein et al

ICAR Recommendation: AVA REC0011

Demo Case “Avalanche Rescue”

- Development of a standard proposal over 23 years
- Since 2010 official national standard in Switzerland
- Since 2014 ICAR consensus workgroup
  “Best Practice in Avalanche Rescue”
- 2016 consensus conference with 15 most important ICAR countries
- 174 illustrations with key instructional text in 13 languages
- Database of 2262 “puzzle parts”
  able to cover all user groups and application cases



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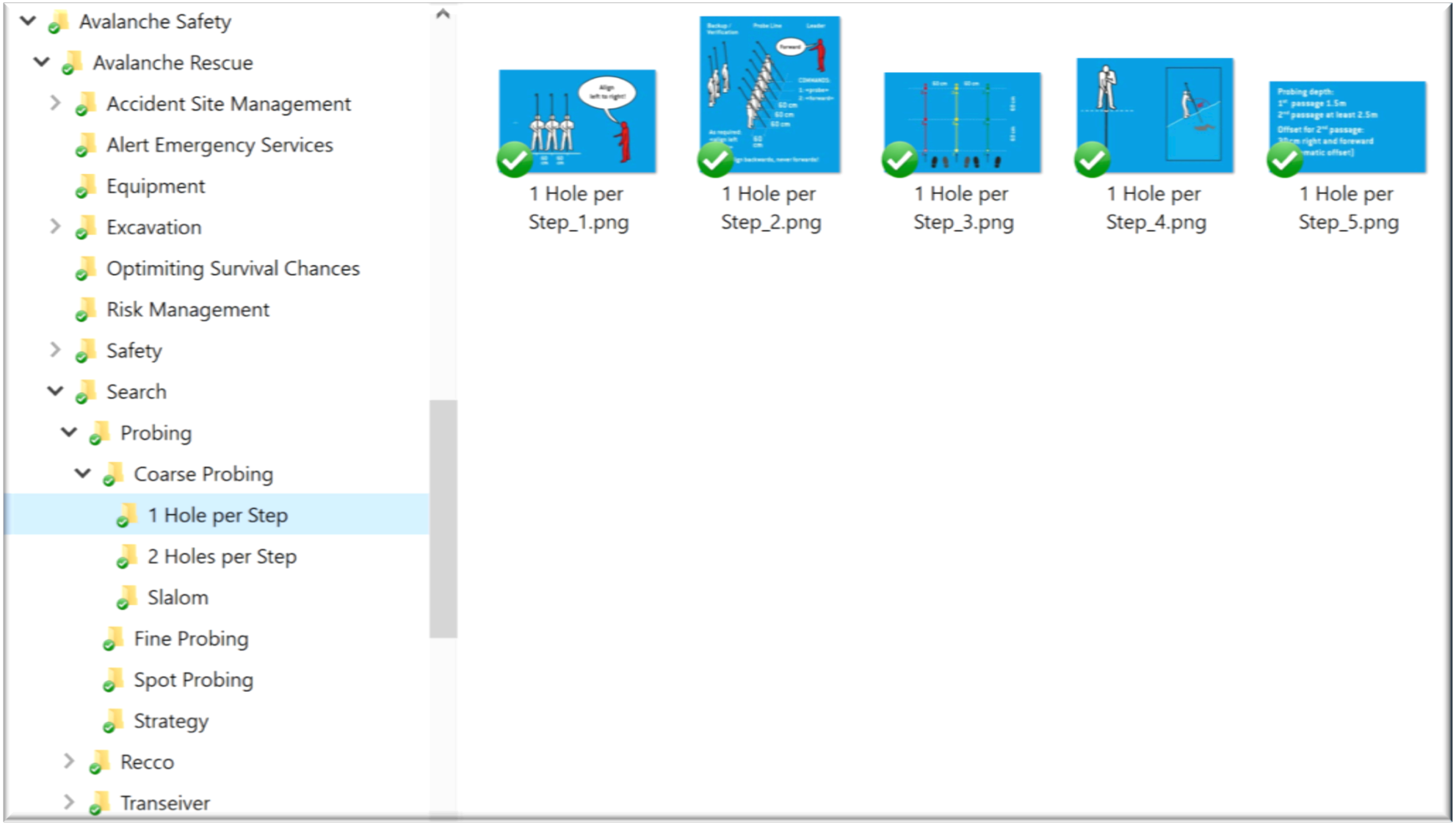
Some Print Screens as Example



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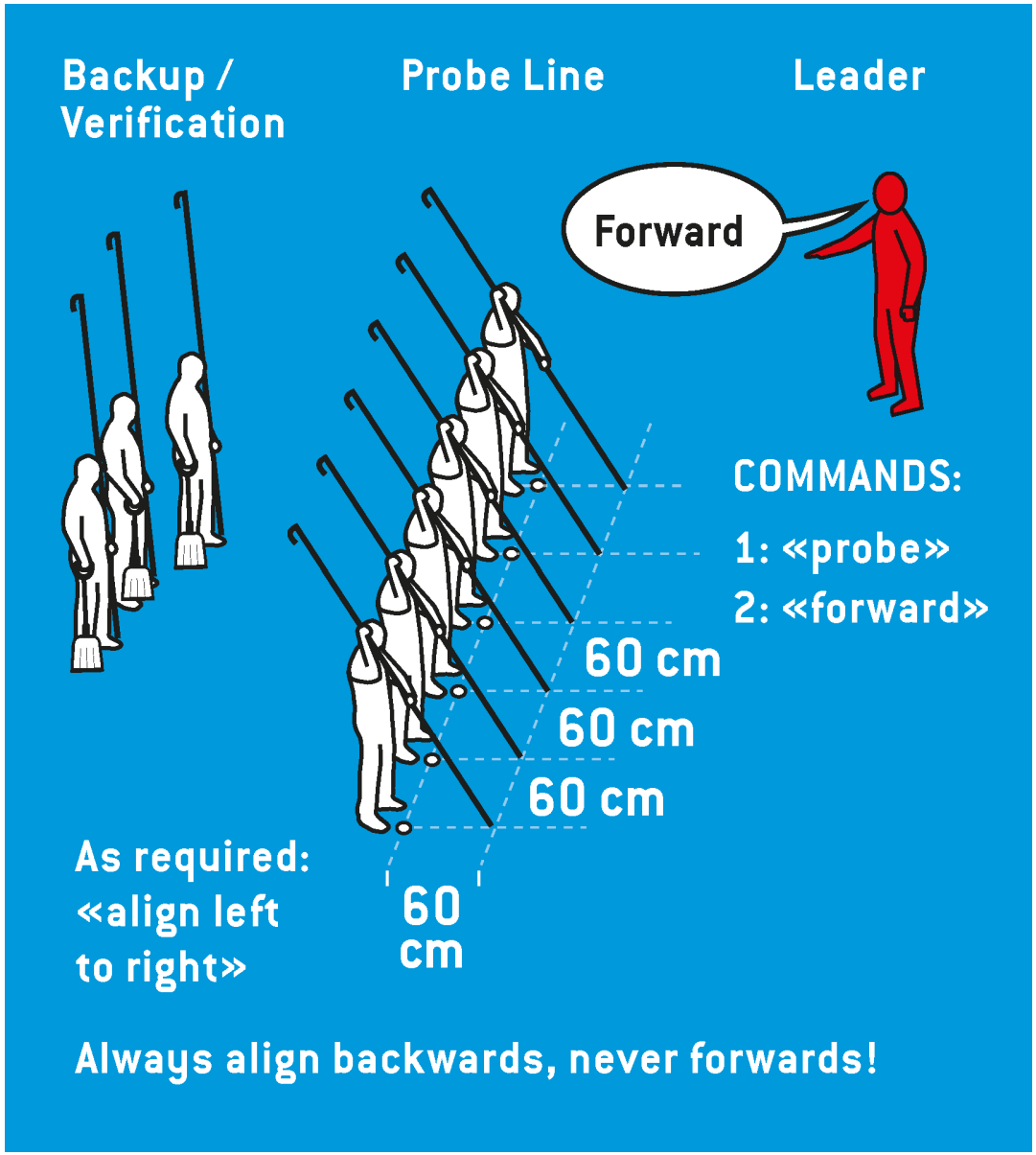

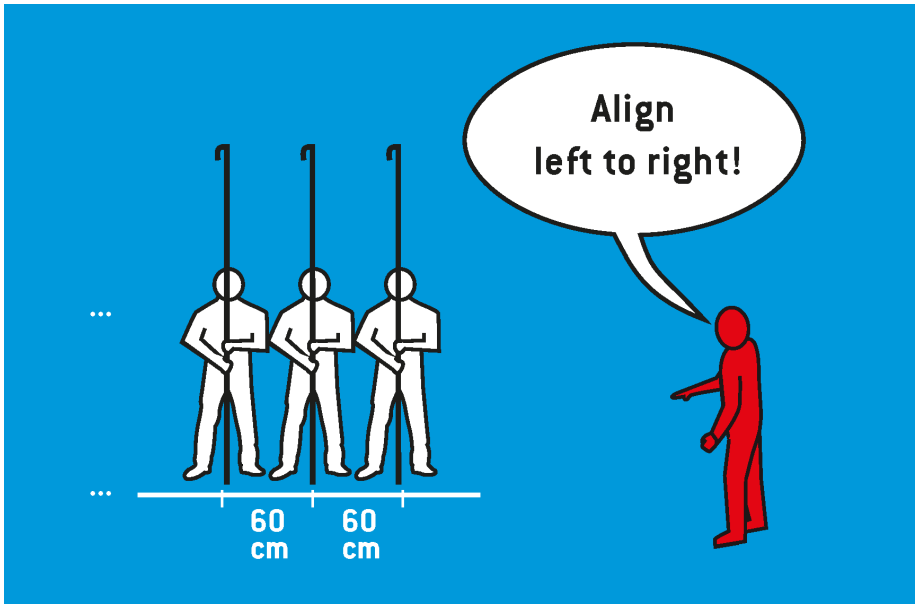

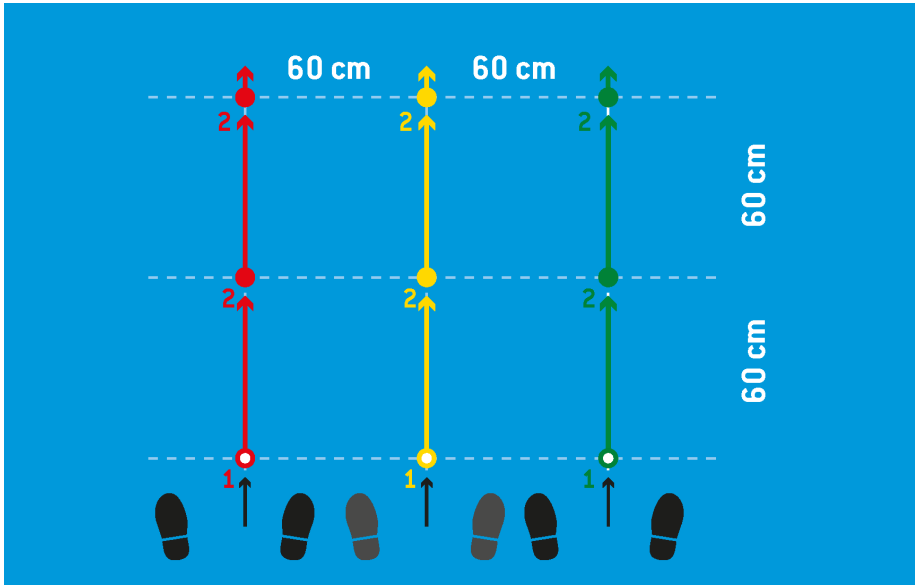

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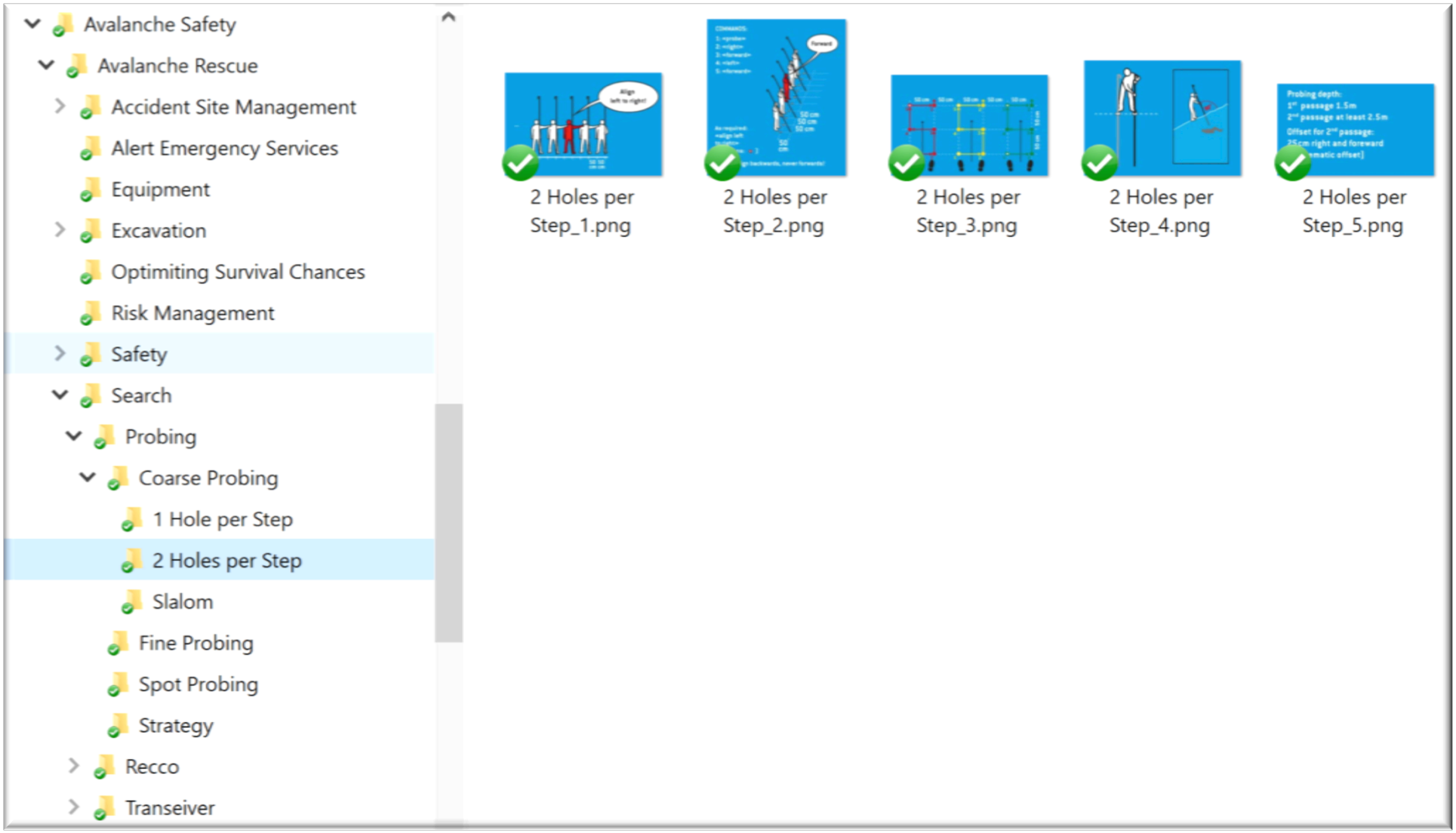

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COMMANDS:

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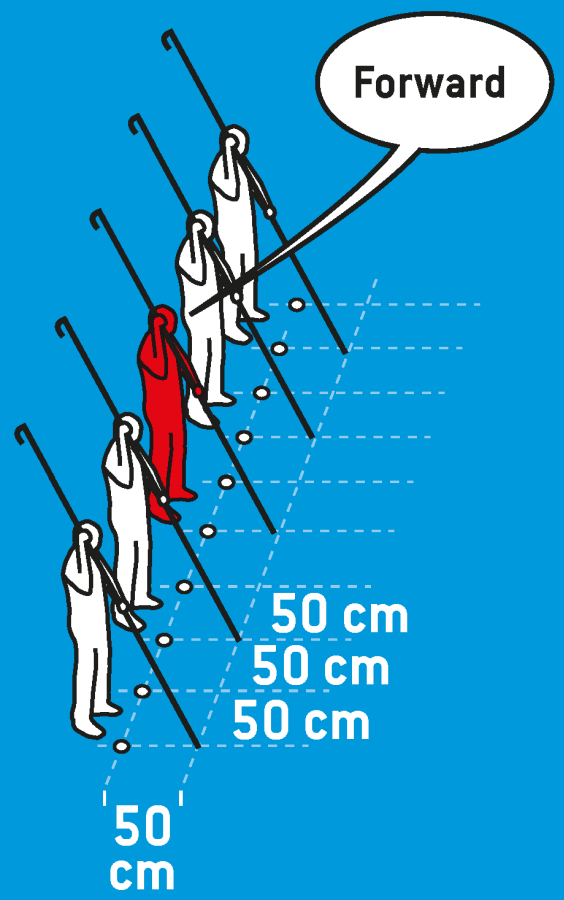
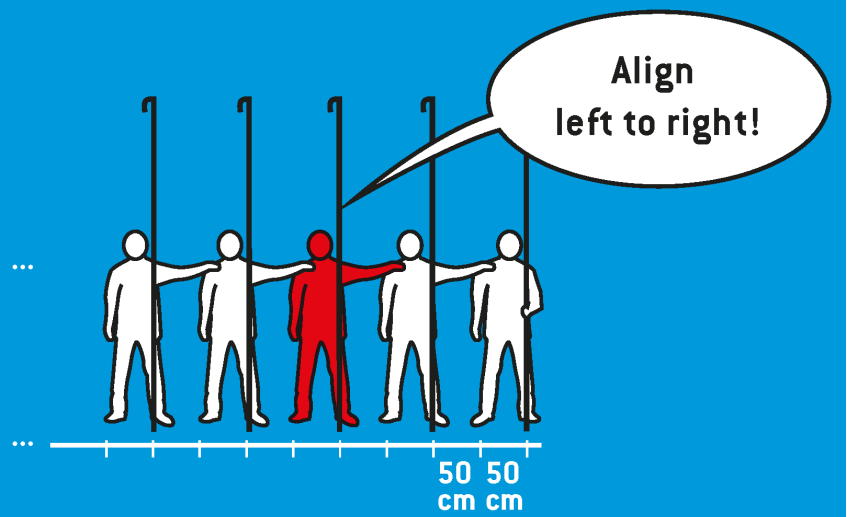
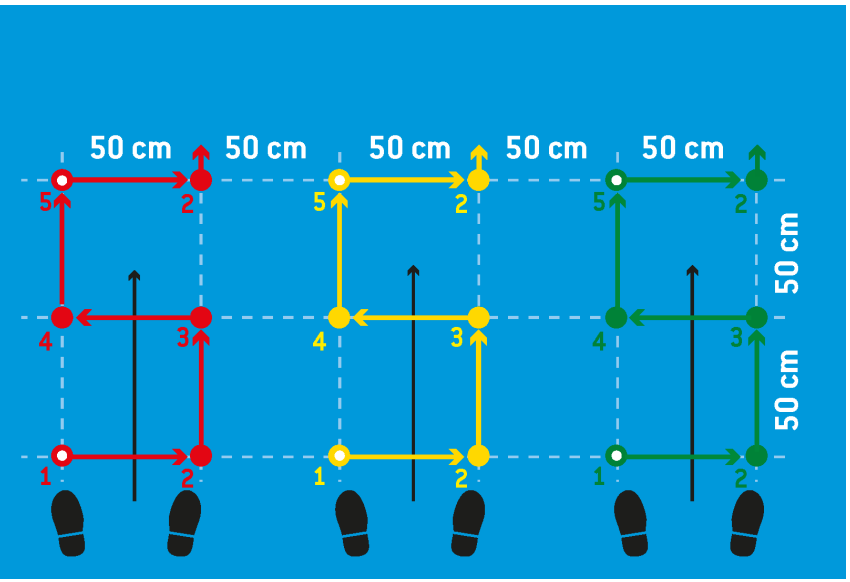


As required:
«align left
to right»
(Positions:)

Always align backwards, never forwards!





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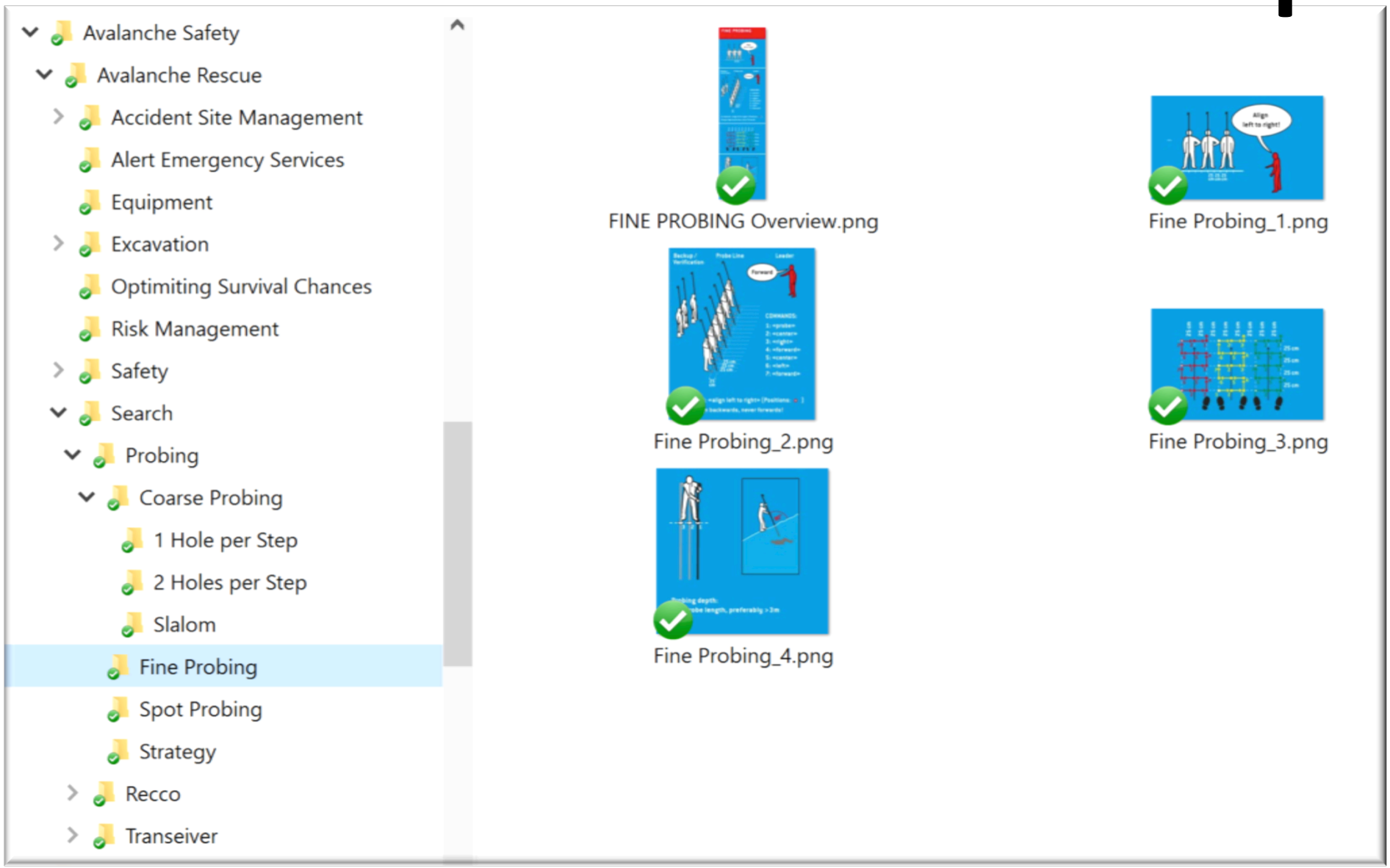

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Mountain Safety Knowledgebase

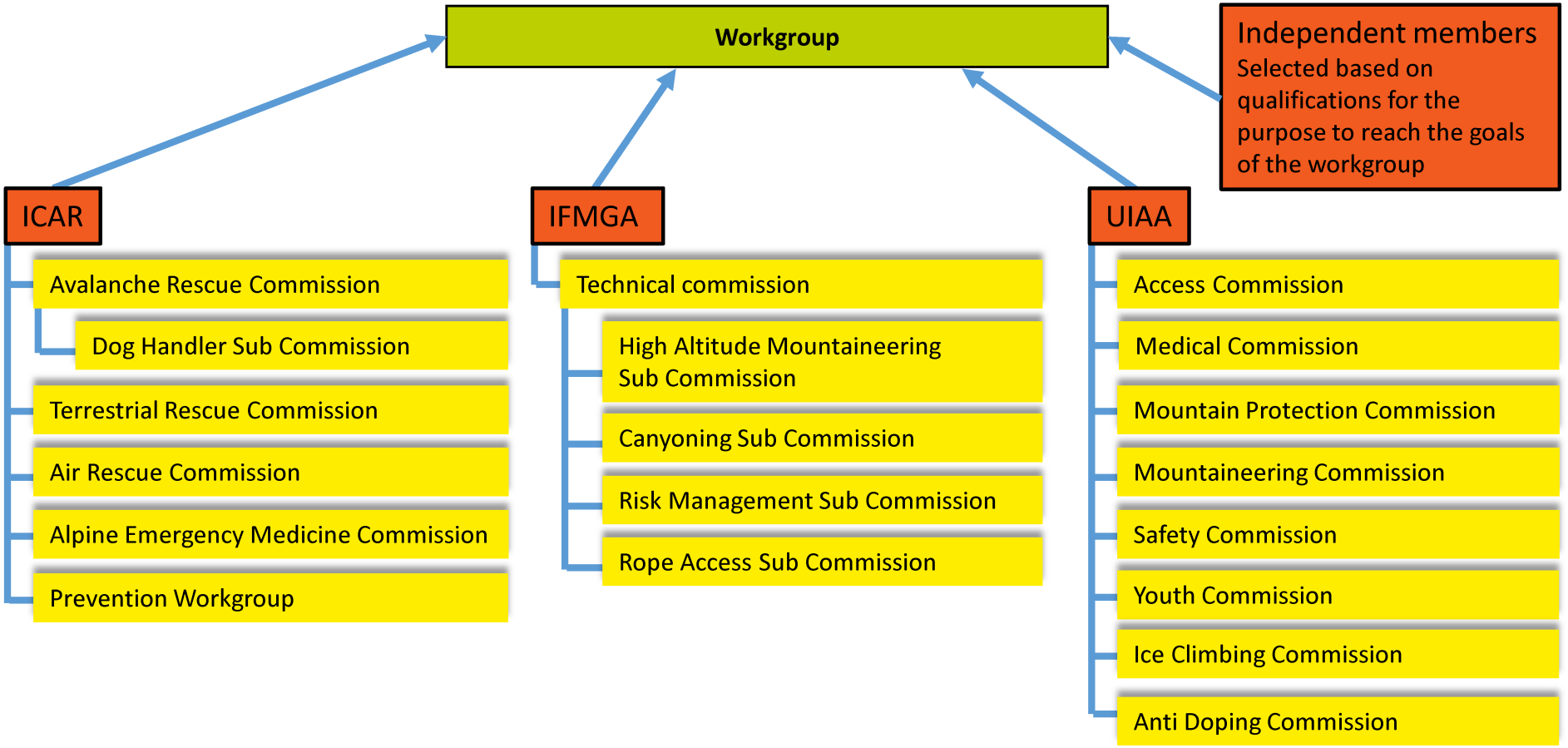
- **Collect existing systems, techniques, strategies and methods from individual and groups of authors**

- **Standardize and harmonize content in subject matter expert consensus workgroups**

Members and Delegates of Workgroups of the Mountain Safety Knowledgebase

Individual workgroup member selection criteria:
Workgroup members are exclusively selected based on qualifications for the task, professionalism, experience and essential language skills.
Hierarchical position or function in their member organizations does not overrule the above mentioned criteria.

Overall workgroup member selection criteria:
- Appropriate representations of the "Mountain Safety Knowledgebase" member organizations
- Appropriate representations of the various user groups
- Appropriate representations of the different application environments
- Appropriate representation of the different geographical area



Mountain Safety Knowledgebase

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Demo Case “Avalanche Rescue”

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- **2016 consensus conference with 15 most important ICAR countries**
- **174 illustrations with key instructional text in 13 languages**
- **Database of 2262 “puzzle parts” able to cover all user groups and application cases**
- **+ 4 Languages in ICAR 2016 = total 17!**

Mountain Safety Knowledgebase

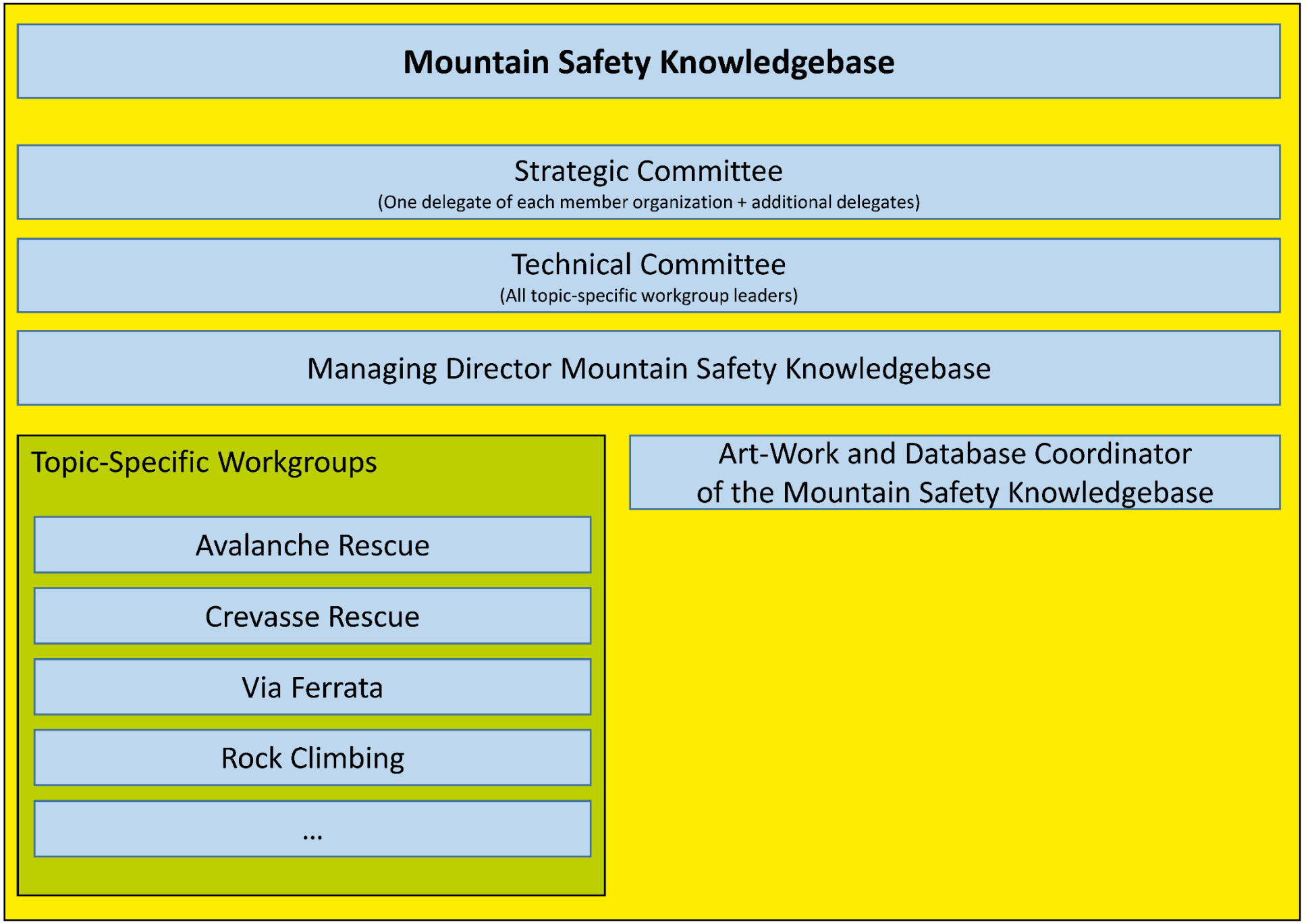
Initiative / Proposal right

Every organization or individual…

- May propose modifications, optimizations and additions to the material in the Mountain Safety Knowledgebase. Proposals will be carefully evaluated by the topic-specific workgroup of the Mountain Safety Knowledgebase. After an addition or optimization has been accepted and implemented, all users of the Mountain Safety Knowledgebase will have access to it.
  As the Mountain Safety Knowledgebase is not based on voluntarism, everyone, independently of their socioeconomic background, has an equal chance to become a contributor.

Mountain Safety Knowledgebase

- **Store the data in a common database**
- **Make data available for a affordable price**
- **Invest revenue in the future development of mountain safety knowhow**


Mountain Safety Knowledgebase
Strategic Committee
(One delegate of each member organization + additional delegates)
Technical Committee
(All topic-specific workgroup leaders)
Managing Director Mountain Safety Knowledgebase
Topic-Specific Workgroups
Avalanche Rescue
Crevasse Rescue
Via Ferrata
Rock Climbing
...
Art-Work and Database Coordinator
of the Mountain Safety Knowledgebase

Mountain Safety Knowledgebase

- **Professionalism**
- **Sustainability**
- **Standardization**
- **Truly global cooperation between all players**

Mountain Safety Knowledgebase

A project of ICAR, IFMGA, UIMLA

in collaboration with UIAA

Scientific partners:

ENSA and SLF

Mountain Safety Knowledgebase

Plenary Session ICAR 2016

Current Situation

- **Large Variety of Systems, Techniques, Methods and Strategies for the Same Purpose**
- **Inefficient Use of Resources**
- **Missing Compatibility**

Economic Situation

- **Increasing complexity and demand for resources of research and development projects**
- **Decreasing availability of resources based on voluntarism**
- **Research and development is a full time, professional activity**
- **Project goals have life-saving, but not a economic effect**
- **No return of investment from those who take advantage of the intellectual property created by the authors**

Unsustainable Business Models for Authors

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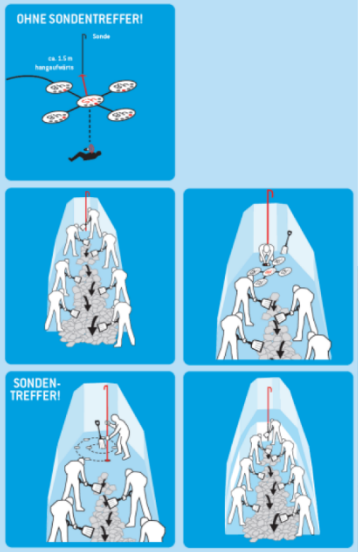
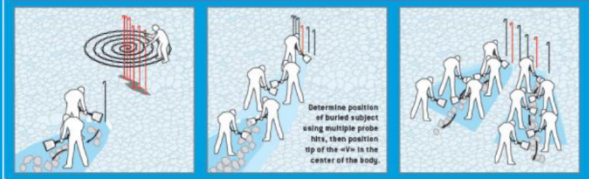
WO GRABEN, WENN KEIN SONDENTREFFER MÖGLICH IST?



ADDITIONAL PRECAUTION FOR THE BURIED SUBJECT
POSITION PROBING
WITH SPIRAL PROBING



≤ 35 min. ONLY apply if many rescuers are available and access to airway is not prolonged by a single minute

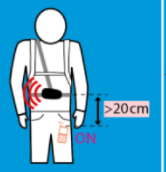
> 35 min. Use spiral probing with multiple probe hits

If many rescuers are available, simultaneously dig two «V» formations to each end of the body.

UNDVIK STÖRNINGAR

Källor till störningar: elektroniska enheter (även avstängda), metalldelar, magneter

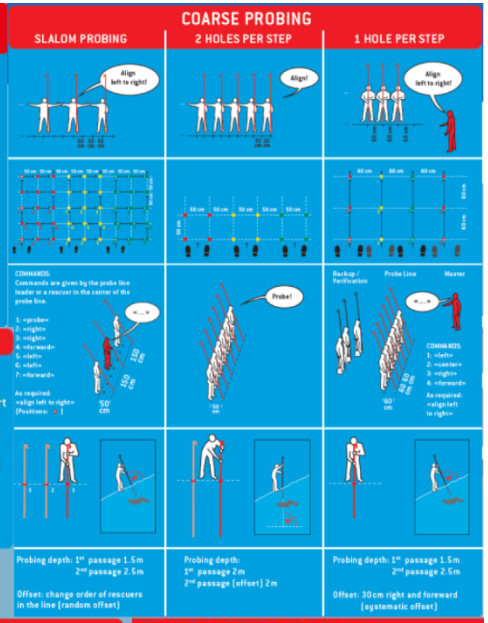
Sänd / SEND



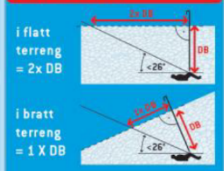
Sök / SEARCH

Alla räddare och vittnen vid lavinen: Stäng AV allt och håll 50 cm avstånd från sökande transceivers.

COARSE PROBING



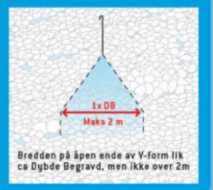
LENGDE PÅ V-FORM



<26° → Snøbiokker ruller ikke tilbake

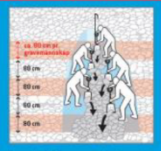
DB= Dybde Begravd

BREDDE PÅ V-FORM:



Bredden på åpen ende av V-form lik ca Dybde Begravd, men ikke over 2m

OPTIMALT ANTALL GRAVEMANNSKAPER

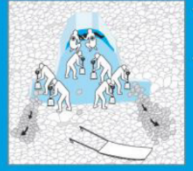


Lengden på V-form / 80 cm = Optimalt antall gravemannskaper

V-FORM KOORDINATOR

Tilstrekkelig med gravemannskaper: Leder avgjør hvem som skal være koordinator og ikke grave

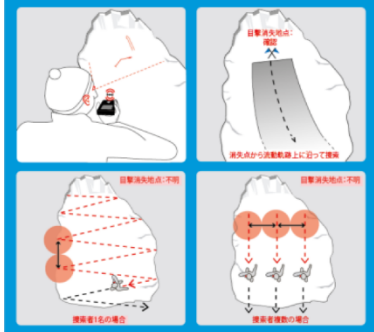
UTVIDET PLASS FOR MEDISINSK BEHANDLING



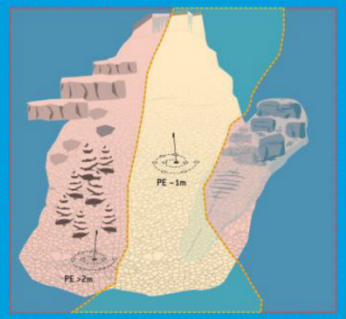
–> Gjennomføres først etter at 1. hjelp er utført

–> Gjennomføres kun dersom den skredtatte er berget og under behandling

シグナル・サーチ（電波受信捜索期）
見渡す、雪崩トランシーバー信号を聴く



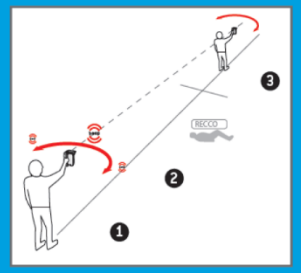
CRITERIOS DE TRAIGE



donde señales vitales "❤" = más posibilidades de sobrevivir

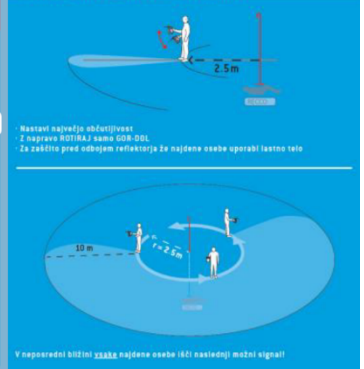
= menos posibilidades de sobrevivir

B RICERCA SOMMARIA



1. Primo segnale:
   - Ottimizzazione definitiva della direzione di scansione e dell' orientamento reciproco Antenna vs Riflettore (angolo di Rotazione)
   - Interrompere il movimento di rotazione
   - Fissare un riferimento visivo
2. Avanzare verso il soggetto sepolto: Verificare la direzione di ricerca durante l'avvicianmento (movimento di scansione)
3. Quando il segnale si interrompe improvvisamente, eseguire l'ultima scansione (tutela da errori nella direzione di ricerca)

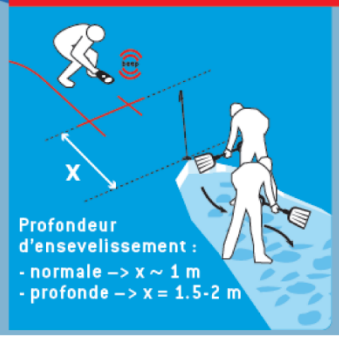
ISKANJE NASLEDNJEGA SIGNALA



- Nastavi največjo občutljivost
- Z napravo ROTIRAJ samo GOR-DOL
- Za zaščito pred odbojem reflektorja že najdene osebe uporabi lastno telo

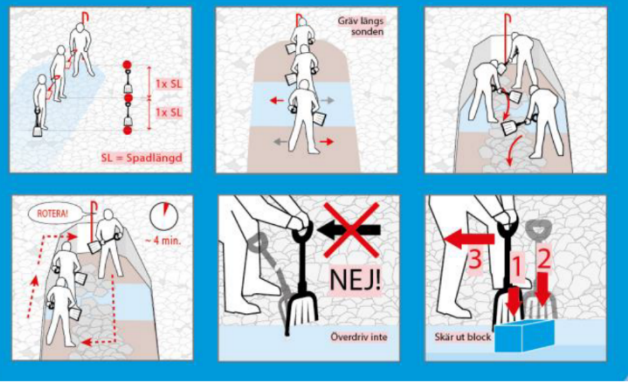
V neposredni bližini vsake najdene osebe išči naslednji možni signal!

PLUSIEURS SAUVETEURS PENDANT LA RECHERCHE FINE + RECHERCHE DU POINT



Profondeur d'ensevelissement :
- normale –> x ~ 1 m
- profonde –> x = 1.5-2 m

GRUNDLÄGGANDE V-GRÄVNING



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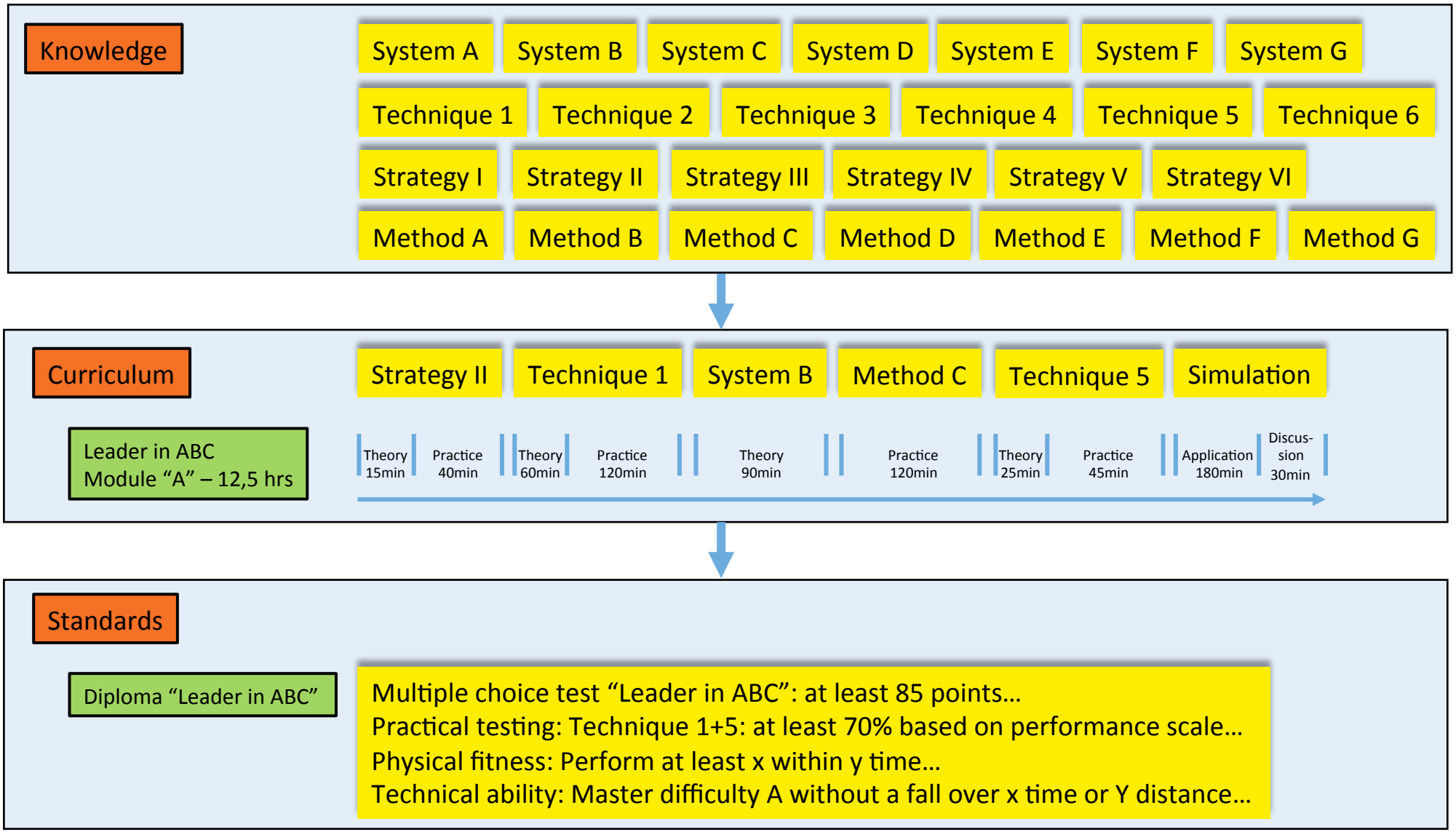

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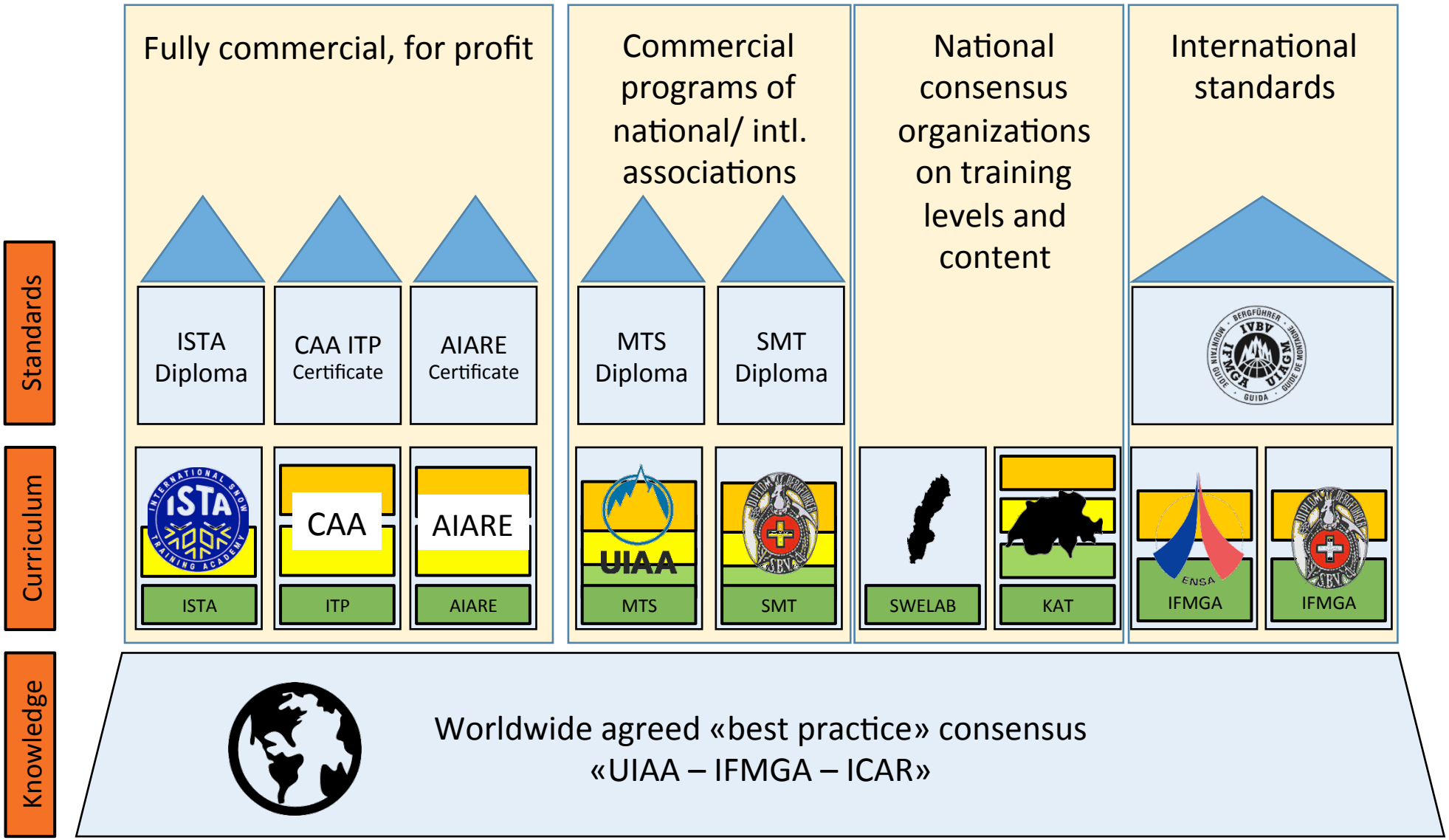

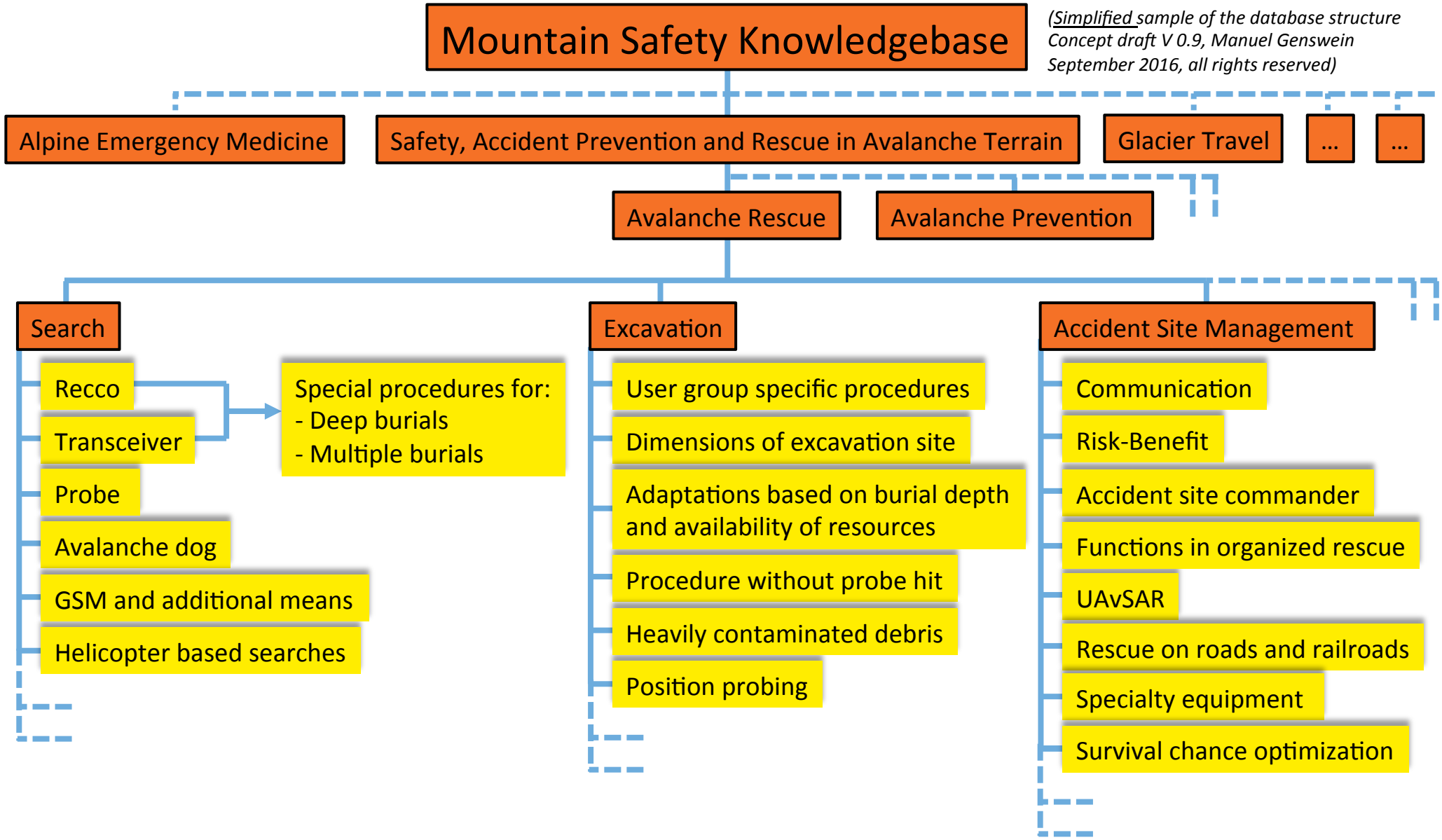
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GSM and additional means
Helicopter based searches
Special procedures for:
- Deep burials
- Multiple burials
Excavation
User group specific procedures
Dimensions of excavation site
Adaptations based on burial depth and availability of resources
Procedure without probe hit
Heavily contaminated debris
Position probing
Accident Site Management
Communication
Risk-Benefit
Accident site commander
Functions in organized rescue
UAvSAR
Rescue on roads and railroads
Specialty equipment
Survival chance optimization

Mountain Safety Knowledgebase

Safety, Accident Prevention and Rescue in Avalanche Terrain

Avalanche Rescue

Search

Probing

Probe lines

Coarse Probing

Slalom Probing

(Simplified sample of the database structure.
Sample for one coarse probe line technique.
Concept draft V 0.9, Manuel Genswein
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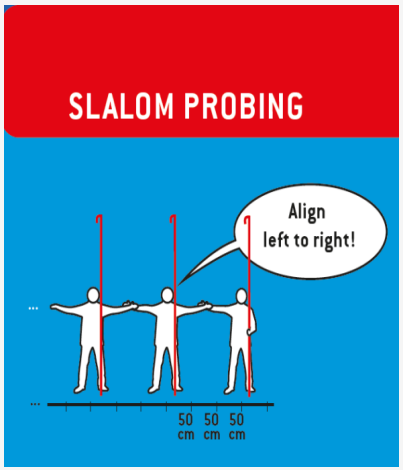
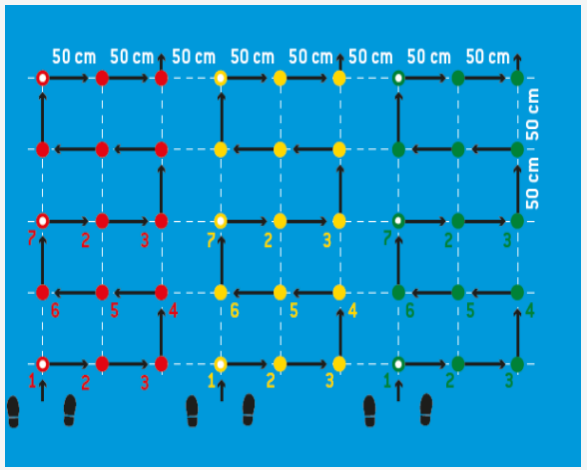
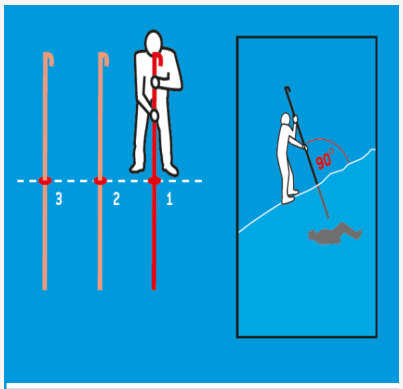






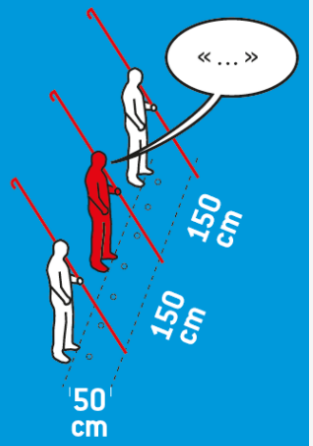
Probing depth: 1st passage 1.5m
2nd passage 2.5m

Offset: change order of rescuers in the line (random offset)

COMMANDS:
Commands are given by the probe line leader or a rescuer in the center of the probe line.

1: «probe»
2: «right»
3: «right»
4: «forward»
5: «left»
6: «left»
7: «forward»

As required:
«align left to right»
(Positions:)



Instruction Text:

Probe master is not required, at this stage it is often more efficient to use a rescuer in the middle of the probe line as improvised probe master.

The probing depth in the first passage is an optimization between:
"area search speed" (m2/rescuer/min)
"likelihood of survival / burial depth"
"percentage of buried subjects / burial depth"

After the first unsuccessful passage in coarse probing, apply it a second time.
A systematic offset of 25cm (1/2 grid width) is very difficult to maintain.
The offset of the grid for the second passage is more efficiently introduced by lining up the rescuers in another position in the probe line.
Every rescuer has a slightly different probing pattern which leads to a randomized probing pattern.

After a second unsuccessful application of course search, apply fine probing.
This must be done with a probe master and very strict marking.

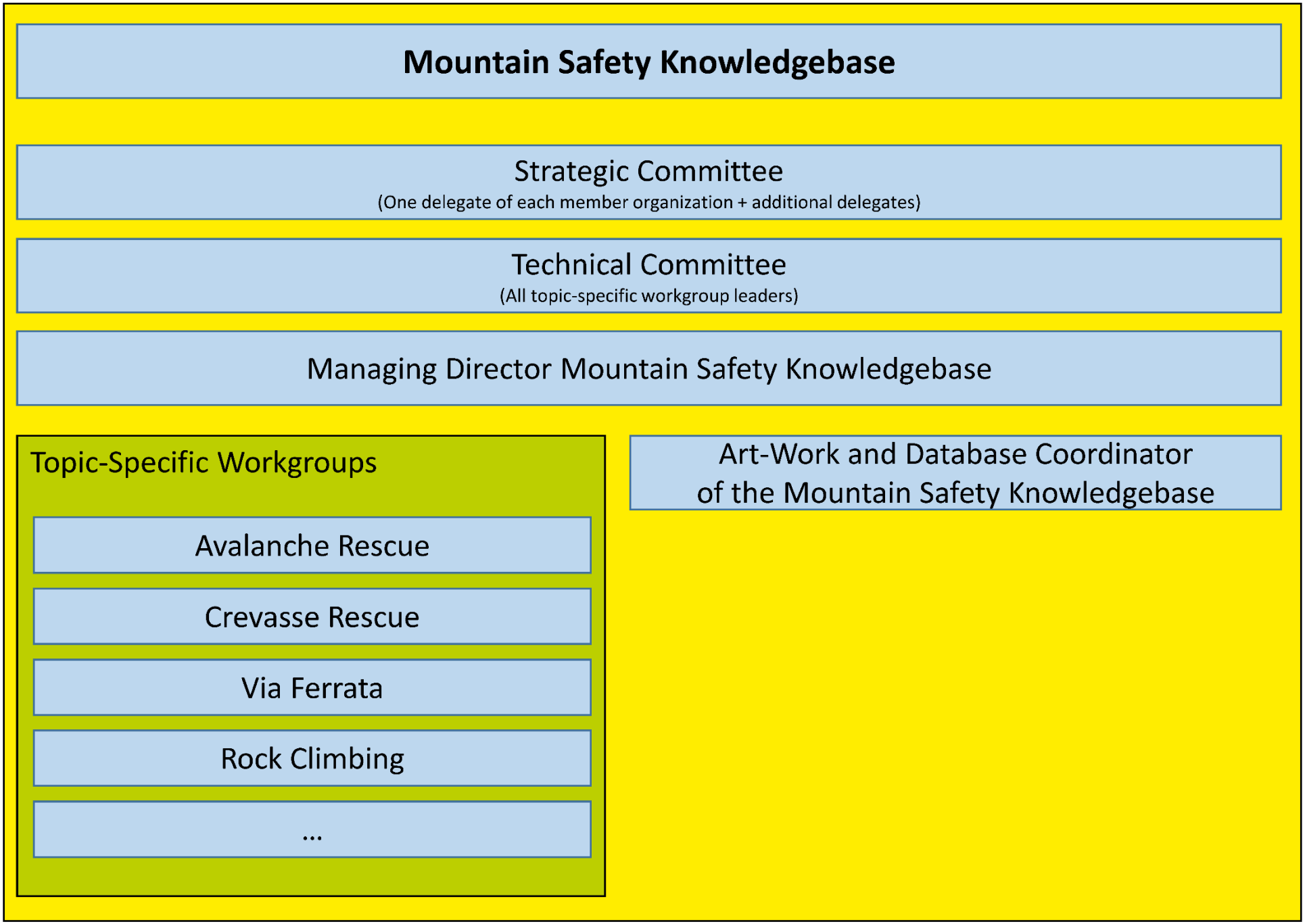
Combine the search with dog teams as soon as possible: The scent cone has a better probability to reach the surface due to the perforation.
After fine probing in a strict manner, removal of the probed layers (1m safety margin to the unprobed debris) with a snow groomer should be considered.

Instruction Video:

Scientific Paper:

Slalom Probing ISSW 2014 Genswein et al

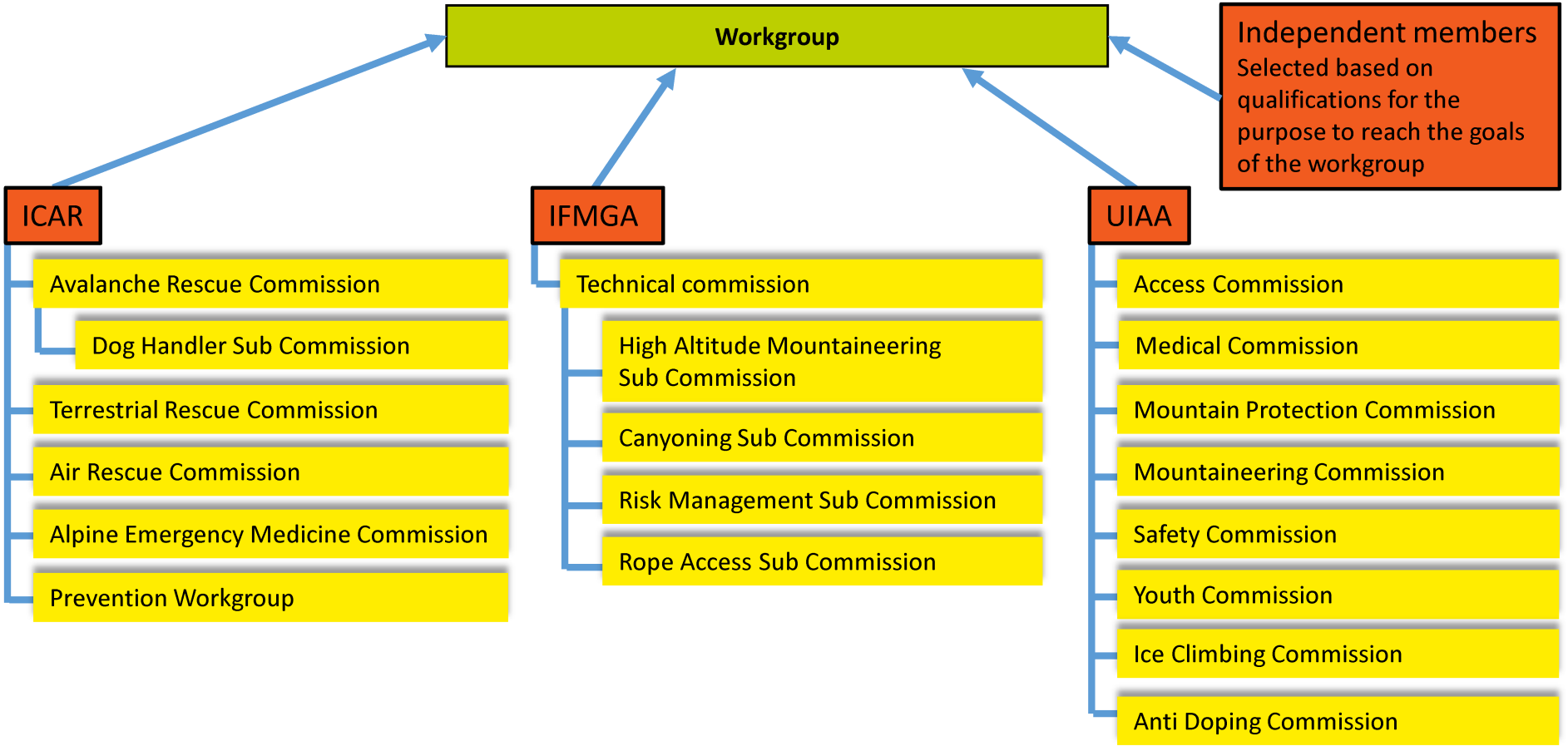
ICAR Recommendation: AVA REC0011

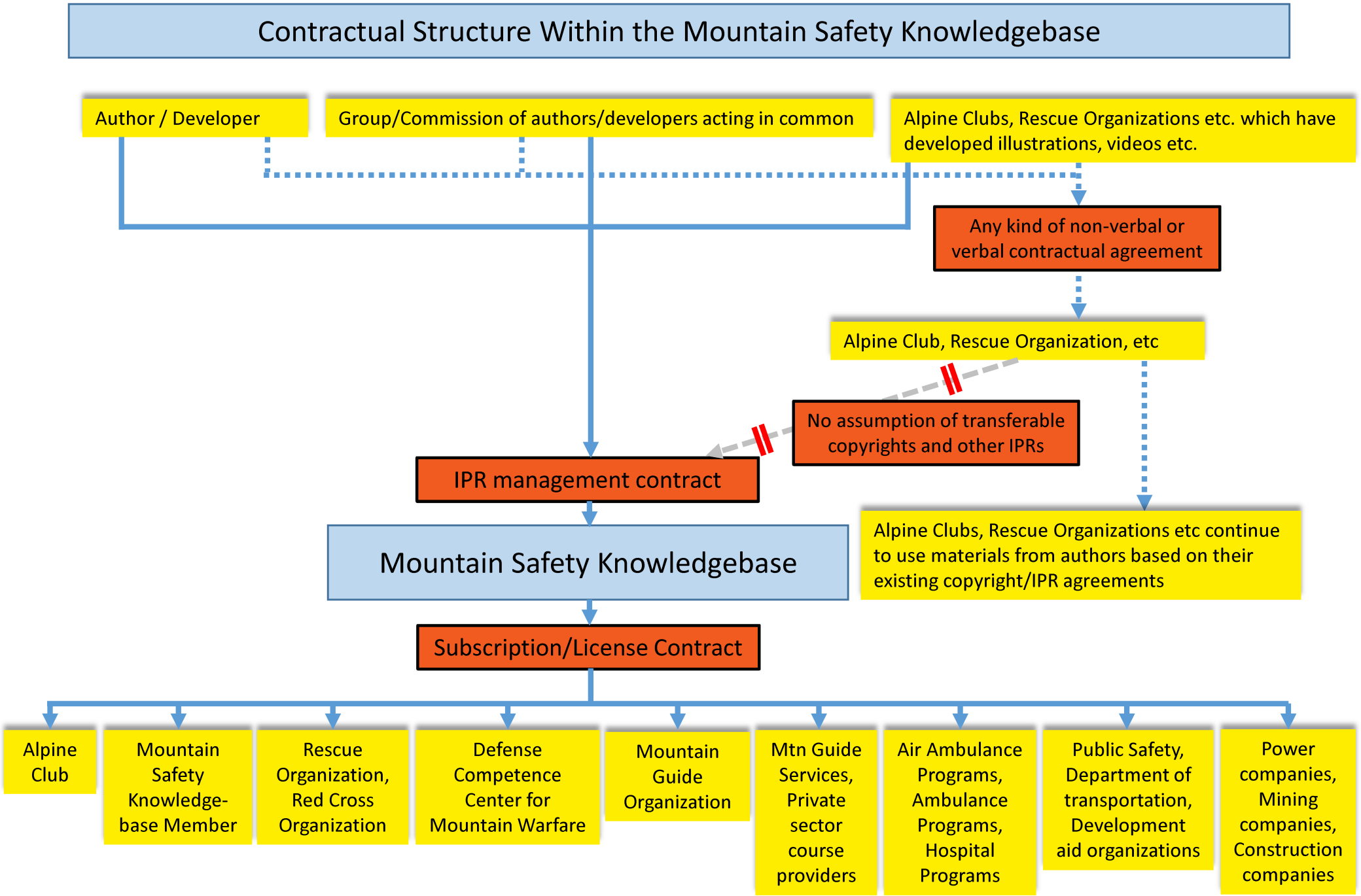

Mountain Safety Knowledgebase
Strategic Committee
(One delegate of each member organization + additional delegates)
Technical Committee
(All topic-specific workgroup leaders)
Managing Director Mountain Safety Knowledgebase
Topic-Specific Workgroups
Avalanche Rescue
Crevasse Rescue
Via Ferrata
Rock Climbing
...
Art-Work and Database Coordinator
of the Mountain Safety Knowledgebase

Members and Delegates of Workgroups of the Mountain Safety Knowledgebase

Individual workgroup member selection criteria:
Workgroup members are exclusively selected based on qualifications for the task, professionalism, experience and essential language skills.
Hierarchical position or function in their member organizations does not overrule the above mentioned criteria.

Overall workgroup member selection criteria:
- Appropriate representations of the "Mountain Safety Knowledgebase" member organizations
- Appropriate representations of the various user groups
- Appropriate representations of the different application environments
- Appropriate representation of the different geographical area




Contractual Structure Within the Mountain Safety Knowledgebase
Author / Developer
Group/Commission of authors/developers acting in common
Alpine Clubs, Rescue Organizations etc. which have developed illustrations, videos etc.
Any kind of non-verbal or verbal contractual agreement
Alpine Club, Rescue Organization, etc
No assumption of transferable copyrights and other IPRs
IPR management contract
Mountain Safety Knowledgebase
Alpine Clubs, Rescue Organizations etc continue to use materials from authors based on their existing copyright/IPR agreements
Subscription/License Contract
Alpine Club
Mountain Safety Knowledge-base Member
Rescue Organization, Red Cross Organization
Defense Competence Center for Mountain Warfare
Mountain Guide Organization
Mtn Guide Services, Private sector course providers
Air Ambulance Programs, Ambulance Programs, Hospital Programs
Public Safety, Department of transportation, Development aid organizations
Power companies, Mining companies, Construction companies

Subscriptions and Commercial Licenses for the Mountain Safety Knowledgebase

Commercial license

A commercial license is required:

- If content of the Mountain Safety Knowledgebase is used in any format as part of publications which get sold
- For any item of the Mountain Safety Knowledgebase for complementary course materials (quick reference chats, safety brochures, booklets etc) of commercial services and courses which exceeds 30 items of the per course and topic.

Reselling items of the Mountain Safety Knowledgebase without adding additional content or making it available as a service which is not part of an additional training or consulting services is not permitted.

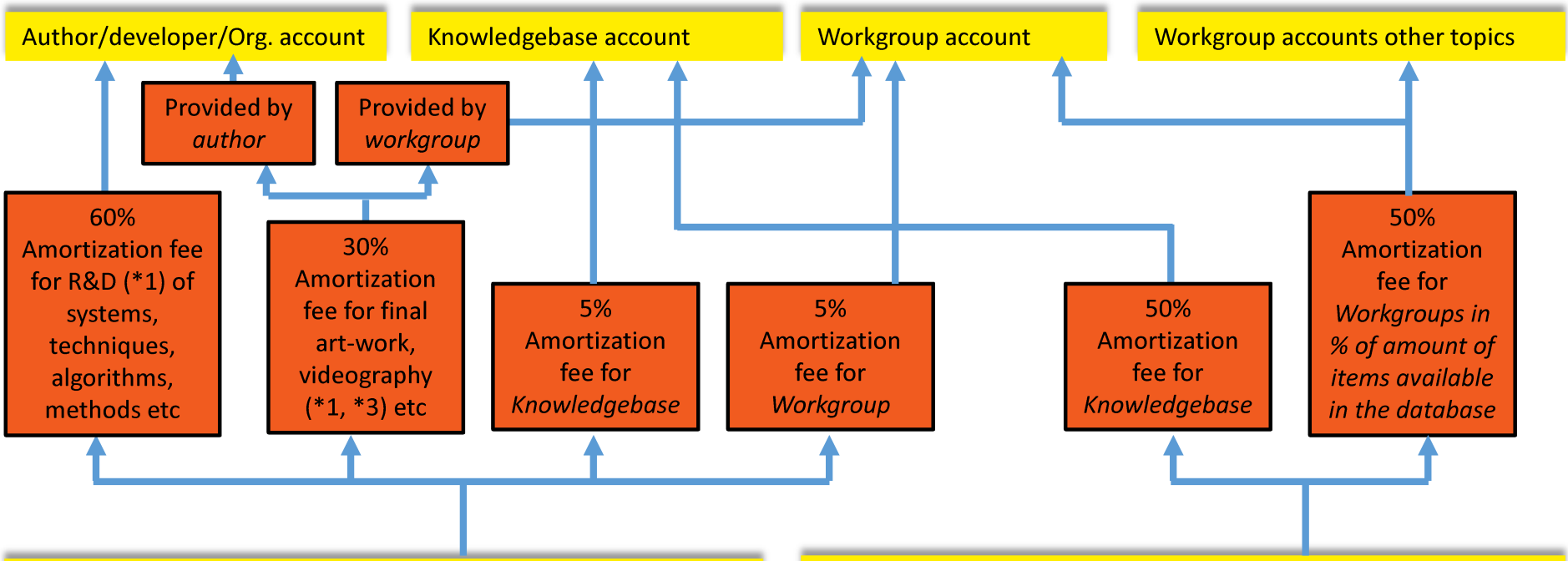
Annual subscription

Access to the entire database based on a license contract.

Unlimited use for non-commercial publications.

Commercial use limited to complementary participant hand-outs up to 30 items per course and per topic of the Mountain Safety Knowledgebase.

Fair Allocation of the Revenue of Subscriptions and Commercial Licenses



Commercial license

Annual, including updates:
- By item (*2)
- By topic

For the entire database

Onetime, lifetime
- By item (*2)
- By topic

Annual subscription

Access to the entire database based on a license contract

(*1) Amortization fees for R&D and art-work/videography may be split between the original, individual author and the workgroup, respectively multiple authors and the workgroup. This may apply when the original work is over time optimized and further developed by the workgroup.
(*2) Particularly resource intense items may count as more than one unit.
(*3) If an author or organization only provides illustrations, videos etc, no R&D amortization fee will be paid.

Author and Workgroup Account

Author account

Available for the work time of the author/developer/group of authors acting in common to cover: expenses, and other resources for R&D projects, art-work and videography provided by the author (internal and external costs). Project and materials must be compliant to the requirements of the Mountain Safety Knowledgebase.

Worktime of the author(s) is compensated according to the daily rate of a national level instructor of the national mountain guide association of the country of *residence* of the author (fair adaptation to costs of living).

Money in the individual author's account which does not get spent within 5 years expires. In this case, 1/3 of the amount of the expired year is paid out to the author and the remaining 2/3 are transferred to the workgroup account.

Workgroup account

Available for the work time of the workgroup leader and the workgroup members, expenses, and other resources for R&D projects, art-work and videography developed by the workgroup or individual members of the workgroup (internal and external costs). Translations and glossary projects (internal and external costs) (*1). Project and materials must be compliant to the requirements of the Mountain Safety Knowledgebase.

Worktime of the workgroup leader and the workgroup member is equal and compensated according to the daily rate of a national level instructor of the national mountain guide association of the country of *residence* of the workgroup leader/member (fair adaptation to costs of living).

If a workgroup member is delegated in a paid position and his employer or contractor does not claim the money for the worktime, it will remain in the workgroup account. This rule does not apply if the delegated individual was forced to accept a volunteer position against his will and in an unfair manner based on his/her economic background.

(*1) Translations, terminology standardization and glossary efforts are considered a general interest and responsibility of the Mountain Safety Knowledgebase and thus are a workgroup effort paid by the workgroup account.

Give and Take for Subscribers and Licensees

Give:

- Pay a moderate annual subscription/commercial license fee
- May propose modifications, optimizations and additions to the material in the Mountain Safety Knowledgebase. Proposals will be carefully evaluated by the topic-specific workgroup of the Mountain Safety Knowledgebase. After an addition or optimization has been accepted and implemented, all users of the Mountain Safety Knowledgebase will have access to it.
  As the Mountain Safety Knowledgebase is not based on voluntarism, everyone, independently of their socioeconomic background, has an equal chance to become a contributor.

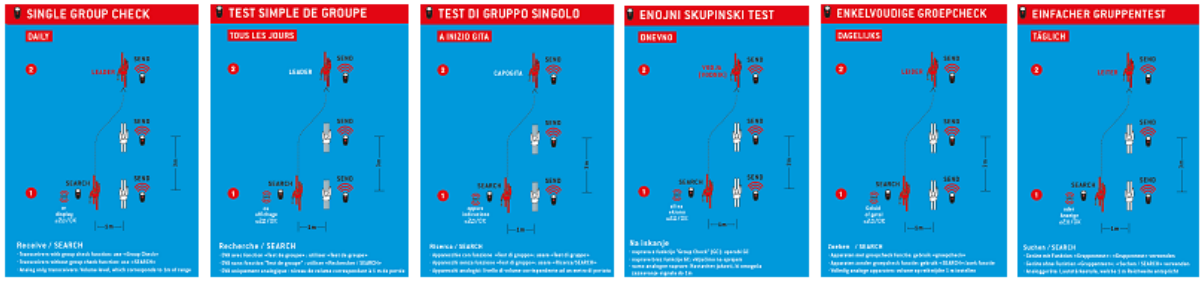
Give and Take for Subscribers and Licensees

Take:

- As an alpine club, rescue organization, commercial course provider, mountaineering school, mountain guide association, public safety agency, defense competence center for mountain operations, power or construction company working in mountain terrain etc, you have access to illustrations, key instructional texts, instructional videos documenting what is consensus international "best practice" in mountain safety.
- Based on the specific needs of your staff, your instructors, your application environment, you create your company/organization-specific materials based on a solid, managed database of international "best practice"
- The annual subscription and commercial license fees of the Mountain Safety Knowledgebase are much smaller than what you would have to spend to create or optimize your training materials without external input

Give and Take for Subscribers and Licensees

- Get materials in many languages, all based on internationally agreed terminology. In international operations, in multi-lingual organizations and countries, dealing with international guest and participants, be sure that everyone has the same level of understanding when working with different language versions of the same strategy, method or technique.



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- No need to care about compatibility issues, the materials of the Mountain Safety Knowledgebase is an internationally agreed consensus
- Using the content of the database according to the license contract makes sure that your organization uses the materials without IPR/copyright issues

Give and Take for Subscribers and Licensees

- Using the content of the Mountain Safety Knowledgebase gives your organization and courses the credibility and assurance to apply the most recent internationally recommended methods, systems, strategies and techniques.
- By being a subscriber/licensee of the Mountain Safety Knowledgebase, you support the sustainable development of new content for the Mountain Safety Knowledgebase. Optimized systems and strategies will help to further increase the safety of your members, clients, employees, soldiers and to make your training courses and commercial services more attractive.

Give and Take for Authors and Developers

Give:

- Give in all or a part of your IP to be managed by the Mountain Safety Knowledgebase (to all readers: please understand, for many authors, this means to "give-in" what they have created over years and in many cases over decades)

Take:

- In topic-specific workgroups, authors are able to get valuable feedback on their system, common performance testing and thus opportunities to optimize their work. Workgroup participation is paid worktime.
- The Mountain Safety Knowledgebase might be able to support R&D projects by providing funding and establishing connections to scientific programs.
- Revenue of commercial licensees makes it possible to continue your R&D work with financial support for resources and the worktime you invest.

Give and Take for Subscribers and Licensees

Take:

- As an alpine club, rescue organization, commercial course provider, mountaineering school, mountain guide association, public safety agency, defense competence center for mountain operations, power or construction company working in mountain terrain etc, you have access to illustrations, key instructional texts, instructional videos documenting what is consensus international "best practice" in mountain safety.
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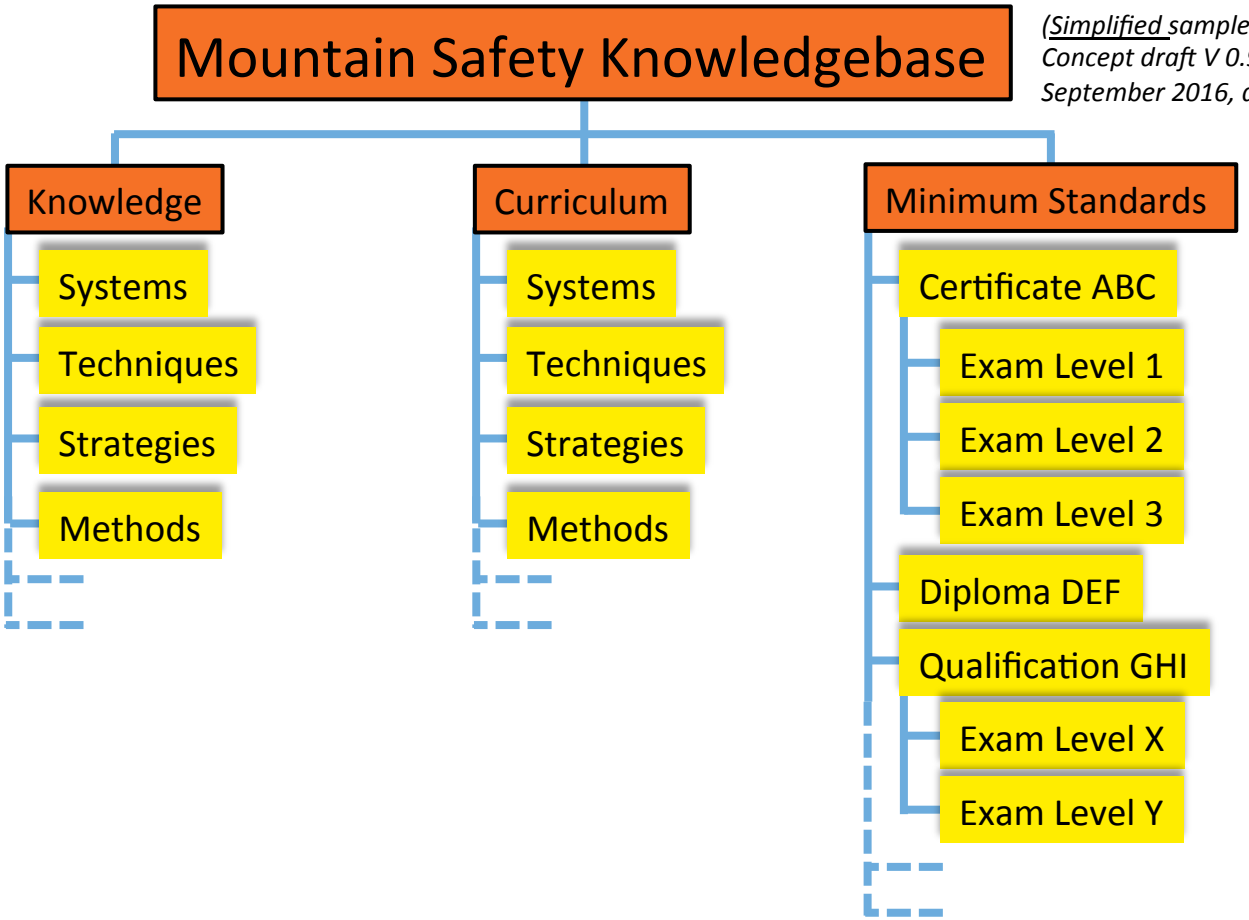
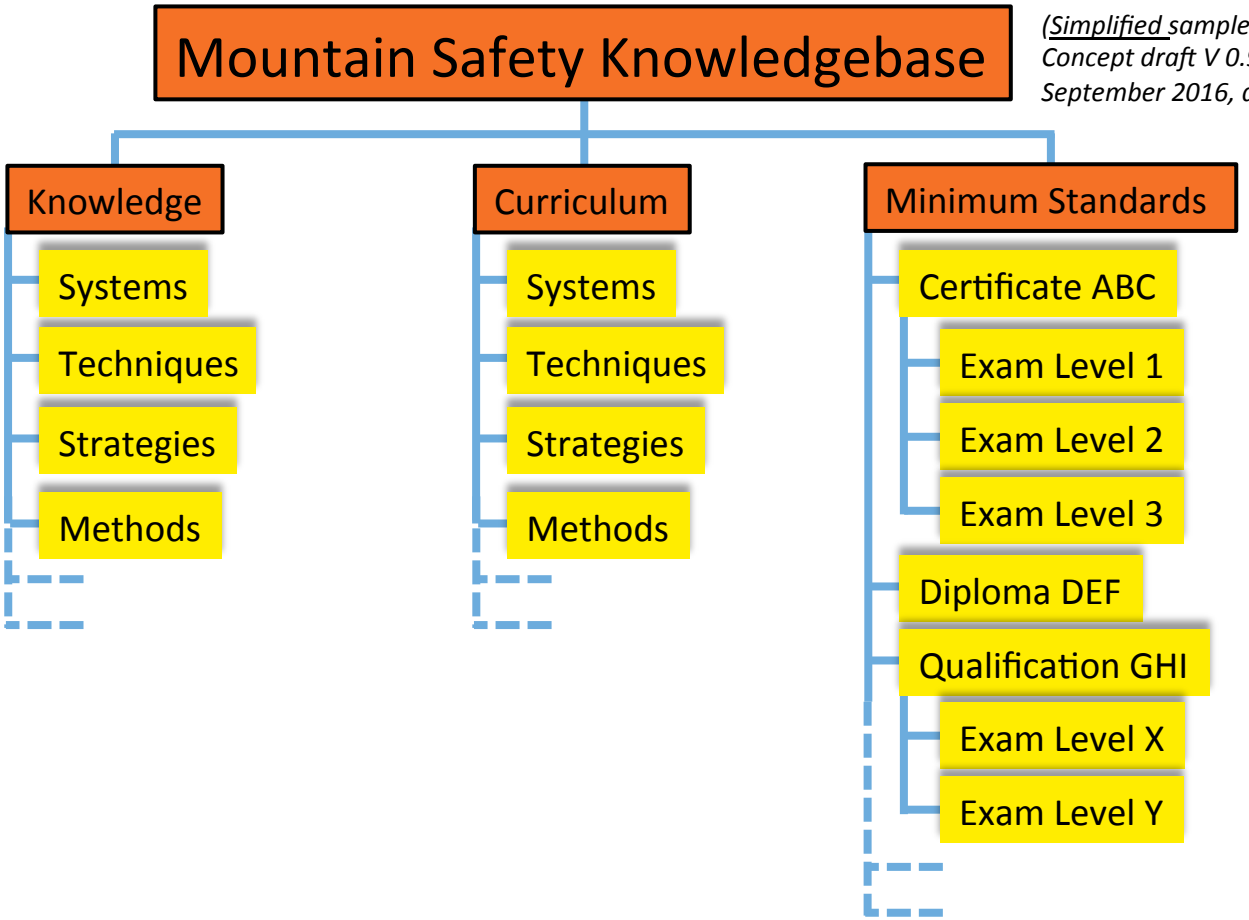
Topics Covered by the Mountain Safety Knowledgebase

- Safety, accident prevention and rescue in rock climbing
- Safety, accident prevention and rescue in ice climbing
- Safety, accident prevention and rescue in glacier travel
- Safety, accident prevention and rescue in canyons
- Safety, accident prevention and rescue in avalanche terrain
- Safety, accident prevention and rescue in cold environments
- Safety, accident prevention and rescue in caves
- Safety and accident prevention in alpine air rescue
- Mountain emergency medicine



(Simplified sample of the database structure
Concept draft V 0.9, Manuel Genswein



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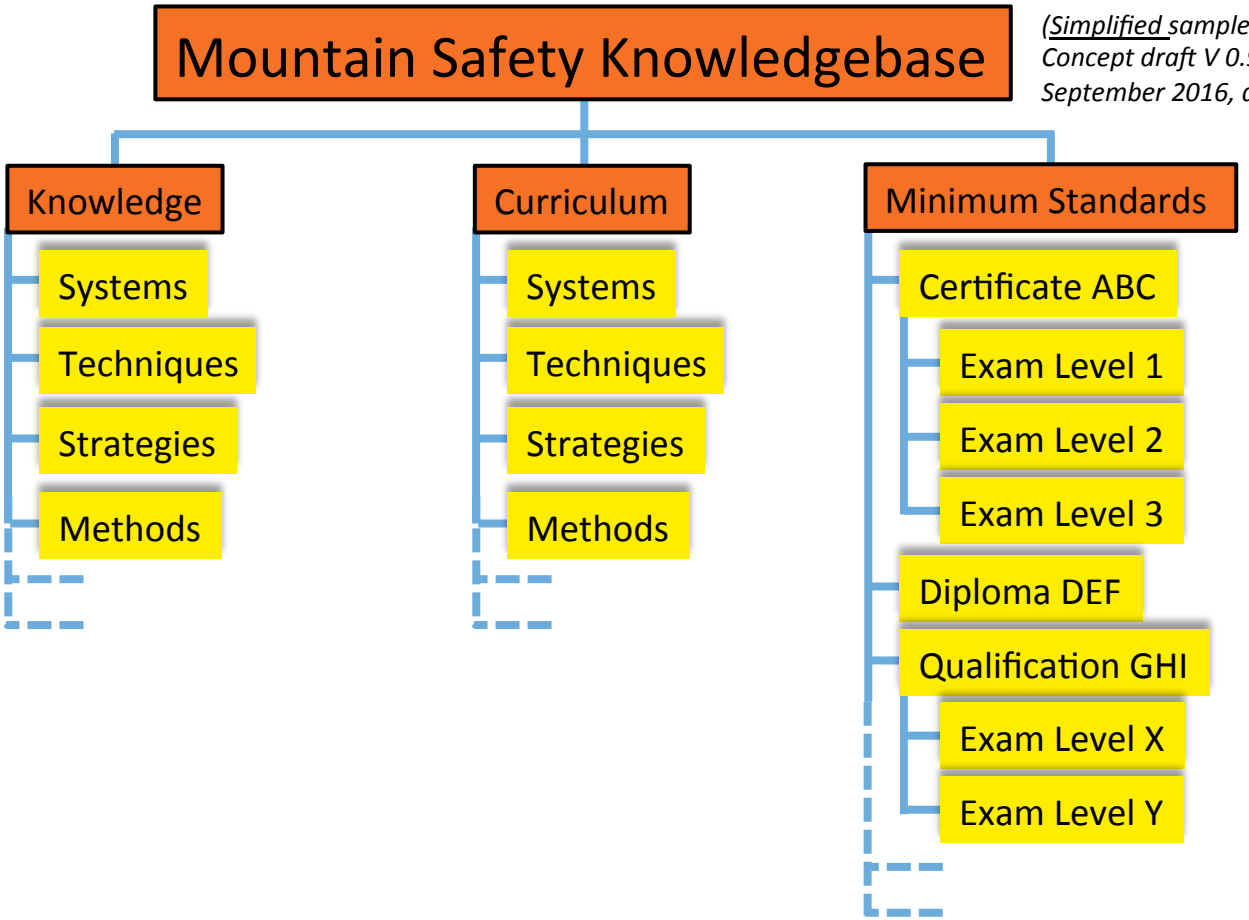

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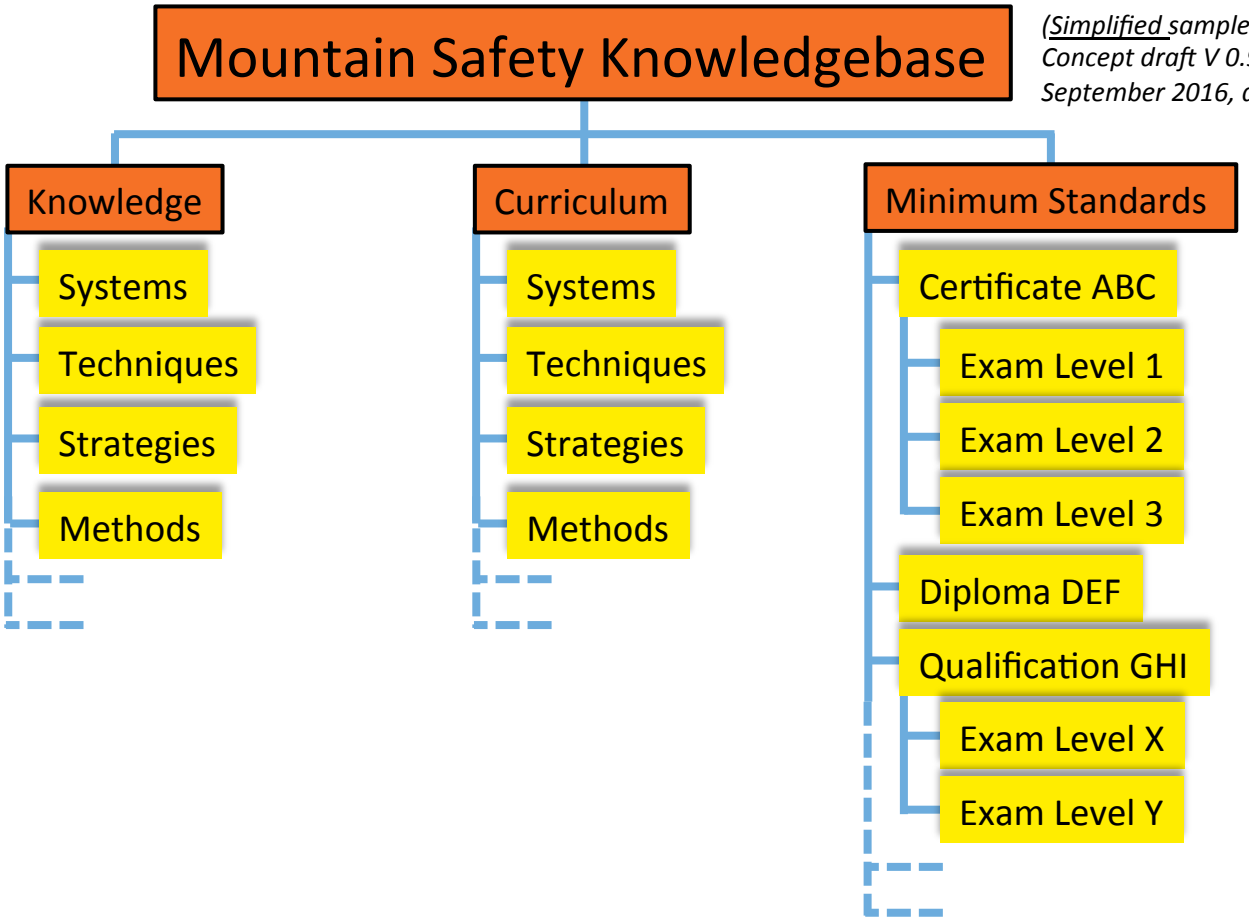

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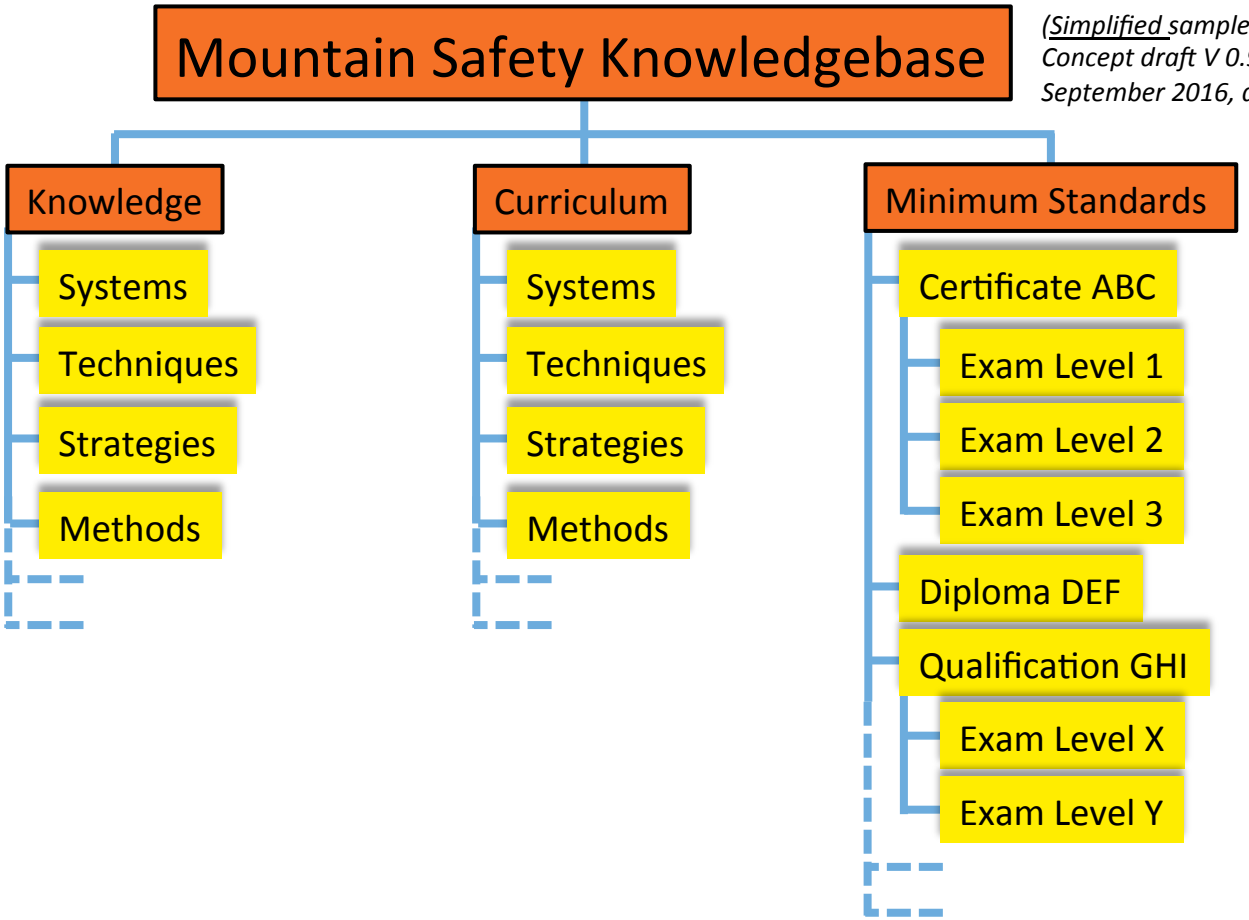

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