

COMNAP-SCAR FELLOWSHIP REPORT

Title: Health and Safety Risk Management in Isolation, Confinement, and Extreme Contexts

Objectives: evaluate the effectiveness of a technological tool for managing health and safety risks in ICE contexts.

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2022.1:

Theoretical works and program development were carried out based on literature reviews and previous academic experiences. The co-supervision of an undergraduate student in physics, in a parallel project, was awarded the best scholarship for Scientific Initiation in Technology by the Federal University of Santa Catarina, with funding from CNPq. Also, contacts were put into practice for the first stage of requirement analysis with specialists for the qualitative adjustments of its Program proposal, highlighting well-known names, such as explorer Amy Klink (navigation), the Guinness record holder to climb both sides of Everest for the first time in Brazil, physician Karina Oliani, mountaineer Rodrigo Raineri and a Brazilian science project leader working with Russia's polar program.

In May, the PhD. candidate was in Rio de Janeiro (Brazil), for the APECS-BR Symposium, participating in the organization of the event, of which he is part of the management. A short course on the project contemplated by the Scholarship was also offered. The edition of the APECS-Brasil Newsletter also had information about the scholarship and a special thanks to APECS-Portugal, which together with APECS-Brasil presented a seminar explaining, in Portuguese, how to apply for the scholarship, being that year with more participation of candidates from South America and, in addition to the author of this report, two more Brazilians were contemplated.

2022.2.

There was a visit to Brasília, talking with representatives of the Brazilian Antarctic Program (PROANTAR) at the Interministerial Secretariat for Sea Resources (SECIRM) and participation in the 74th Meeting of the Brazilian Society for the Progress of Science (SBPC), at the University of Brasília. Also, a visit to the ships of the Brazilian Navy, in the port of the Navy, preparing for a new mission in Antarctica and providing support to PROANTAR took place on a visit to Rio de Janeiro, on the occasion that the rapporteur participated in the NoBuggedtScience, of the Instituto Serrapilheira, selected among candidates from all over Brazil for the immersion event in data analysis.

She planned activities in Portugal, with co-supervisor Pedro Marques Quinteiro, for the second half of 2022, holding classes at the University of Lisbon and Universidade Lusófona, respectively for the courses in psychology and economics and technologies. She presented the proposal to the members of the Portuguese Polar Program (PROPOLAR), gathering information for the elaboration of the final architecture of technologies for the context of difficult access. A paper on Quinteiro's work was prepared jointly, also with other international collaborators, on a study in an analogous space simulation environment.

On November 15, 2022, he received first place in the Innovative Practices in Psychology award by the Federal Council of Psychology (CFP), in the event with the project and other

professional actions developed in the field of Psychology in Brazil, highlighting the advances in the polar field .

In December 2022, he participated in the Wild Summit, of the Brazilian Association of Medicine in Remote Areas (ABMAR), with which he expanded the range of specialists to analyze the requirements of the second stage of the proposal.

On December 1st, Antarctica Day, he took over as vice-president of APECS-Brasil management. Papers are being discussed to be presented at the 2023 HASSEG-SC-HASS, which will take place in Lisbon, under the coordination of the co-supervisor of the candidate rapporteur, Quinteiro. Also, the project for a book resulted from this experience, presenting health and safety care protocols for expeditionaries in activities in remote areas, initially published in Portuguese. The application, a support tool, should be developed by a startup, based on the requirements raised, however, tests with the Polar Sapiens application, without offline functionality, should take place by February 2022 to integrate the thesis to be defended.

Scheduled for 2023:

Contacts with managers and participants of polar programs and expeditions to remote areas, to validate the program proposal (intention of implementation in at least one context) and the preparation protocols (safe behavior) and follow-up in the pre, during and post phases activity, including baseline/history.

Leaders or managers interested in the continuity of the project will be consulted for its viability, including the development of software by startup that meets the requirements already collected: offline functionalities, feedback for self-management, integration with data and waiting in the "queue" (storage on the device) of the activity and responsible.

Objectives partially achieved:

a) Program (Figure 1);

b) analysis of software requirements (investments for its development are necessary, considering that the available version is in force, however, it does not meet identified barriers, although it can be used in the pilot implementation in January or February);

c) guidelines for international collaboration in the eventual explicit interest in the proposal for its continuity, including as a model for spatial actions, aiming at co-authorship and co-ownership in technologies resulting from this.

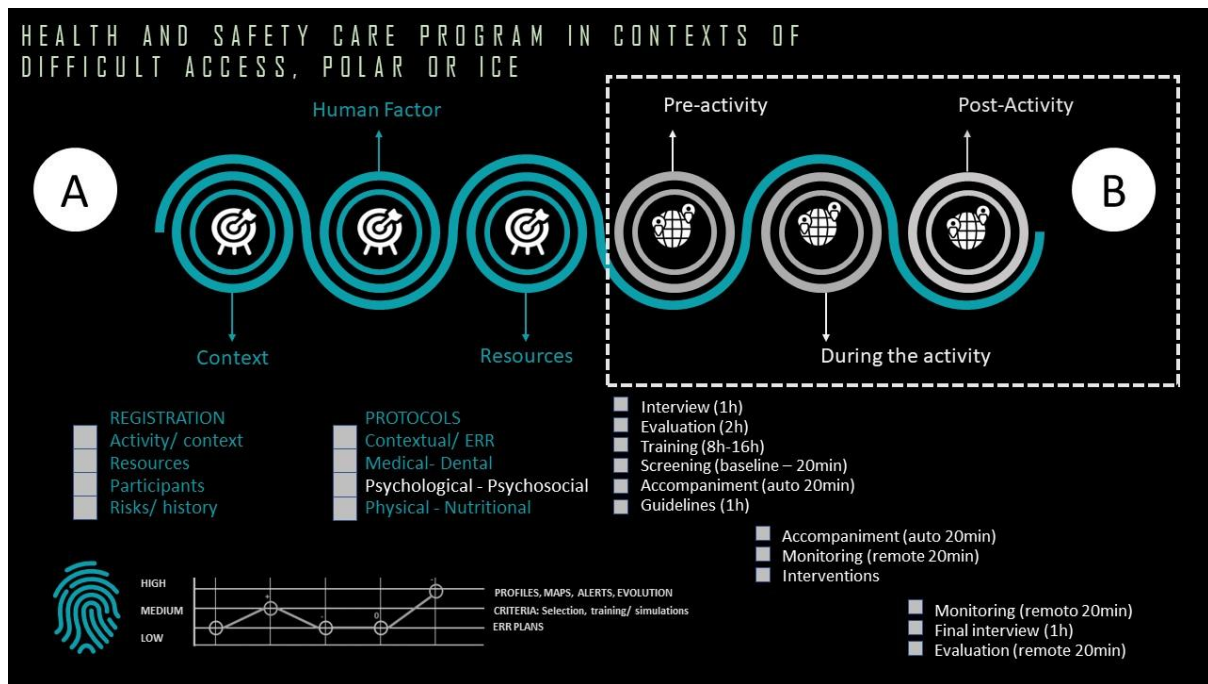


Figure 1. THE HEALTH AND SAFETY ATTENTION PROGRAM IN ACTIVITIES IN DIFFICULT ACCESS AREAS

It offers polar programs, project leaders and groups organized in expeditions to remote areas or ICE environments a checklist and direction of indicators of health and safety attention, highlighting among the protocols, the psychological and psychosocial, deepened in the current thesis, which pervade the stages of (A) description of the activity, participants and resources, and of stage (B) phases of the activity.

How it works?

Following the structure of a hierarchical checklist, program/project/group managers or leaders initially perform in STAGE A:

1. Registration of activity CONTEXT information, including: location/destination, timetable and itinerary (including means of transport to reach the location/destination);
2. Information about the HUMAN FACTOR (positions, functions, skills, competencies, quantity, etc.) required by the activity with the established classification or disqualification criteria;
3. Information on RESOURCES - necessary, available and sufficient gifts or important for the management or acquisition by the participants (tools, equipment, supplies, clothing, facilities, techniques, national and international agreements, authorizations, organizational and economic aspects present)

Participants perform in STAGE A:

4. Registration of your identification information - occupational partners
3. Completion of questionnaires, screenings, tests and delivery of exams listed in the PROTOCOLS of the calendar: (contextual/ ERR; medical/dental; psychological/ psychosocial, physical-nutritional)
4. Finally, they participate in a multidisciplinary interview for anamnesis, generating the medical record that may or may not be shared without being anonymous, according to the defined parameters.

This information generates: activity profile; resource profile; profile of participants/groups, highlighting risk and protection indicators, in addition to protocols that are attentive to the specificities of the context, resources and participants for a quick response to so-called Undesirable Events: illnesses/accidents/crises - updating the evacuation, relief and rescue PROTOCOLS (ERS). For example, in a context with a greater probability of insect bites, it is important to feed the medical protocol with specific vaccines that would not be recommended in contexts other than this one, given the available evacuation protocol, by air, sea or land, as well as the remote assistance, if feasible. As for a profile that indicates participants with some disease or comorbidity, the protocols also address this issue, either with training or qualifications for early identification of signs and symptoms and containment, without going beyond all the critical indicators considered.

In the activity phases (pre, during and post activity), STEP B of the program, it is foreseen that the specific **PROTOCOLS** for the pre-activity, during the activity and after the activity phases are followed:

CONTEXTUAL: information provided to participants in the activity by managers/leaders on environmental and political aspects, and on the activity itself always aimed at avoiding the activation of ERR protocols (evacuations, relief - physical or remote - and rescues). The ERR protocol must be prepared by the mission managers following the program's guidelines, and must include the actions for evacuations (escape routes, possible means of transport hierarchized according to serious situations, expected behaviors for preservation or destruction of present resources, prioritization of the human factor in levels of possibility of rescue or severity, international agreements that facilitate the process, means of communication, etc.), assistance (primarily remote, by telemedicine, for example, or with the presence of the professional/ who can reach the place to carry out their interventions, by which means of transport, considering time, climatic and feasible aspects) and rescues (when only one or more members, not the entire group/population is evacuated, for interventions impossible to be carried out by help that arrives at the scene, or remotely, and that does not require the release of all those present, as in the case of a fire).

CONTEXTUAL PROTOCOL comprises basic information about the activity, location, duration, difficulties, risks, inherent political/historical aspects, international relations, etc. so that the obligations and duties of all involved are understood, as well as the need to comply with rules, established protocols and responsibilities, costs and others. It also includes guidelines for the acquisition of clothing, tools, equipment/facilities, supplies and others necessary to carry out the activity, when not provided by management or when complementary/personal; specific training related to the activity: fighting fires, use of critical equipment (generators, means of transport, generators, telephones/radios), in case of biological risk, abandonment of the vessel/installation, survival in the specific context).

PHYSICAL-NUTRITIONAL, includes recommendations for physical exercises and physical assessment before, during and after the activity, as well as dietary guidelines and adequate menus to face the challenges of the context. Example: in places of intense heat, foods with more liquids and salts for replacement, with vitamins for supplementation, etc., in addition to indications of movements that may facilitate adaptation to the location and reduce the risk of accidents and illnesses. It includes the suggestion of food for personal acquisition and exercise program, as well as tools/equipment necessary for practices, including monitoring.

MEDICAL-DENTAL, prepared by professionals trained in the area, must meet the minimum requirements of the mission and become responsible for the protocol (training and qualification in first aid; vaccines for the context; pharmacy and individual kit for personal acquisition - information to the group about the care situations: members who may have diabetes, epilepsy, allergies, etc.), orientation for setting, risks of the context that require attention, in addition to the request for laboratory imaging tests and others, such as clinical, considered essential for the activity in their pre phase).

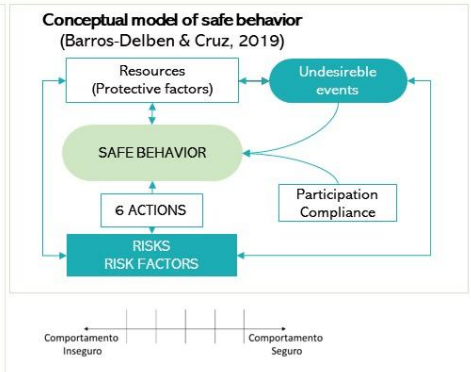
PSYCHOLOGICAL-PSYCHOSOCIAL (complete - undergoing validation): It covers the psychological aspects, especially related to the mental health of the participants, as well as the psychosocial aspects that extrapolate to safety issues, based on the behavior of the members of each group/activity.

- Collective or individual guidelines for economic organization and personal management during the period of removal from activity in areas of difficult access (programming with payments, receipts, bank accounts, telephone, e-mail, emergency contacts and directions, acquisition of money in local currency of the destination, effective updated currency conversions, credit cards, access telephones such as embassies and emergencies, guidelines for purchasing travel insurance, organizing bags with what is necessary and sufficient, checking required documents, recommendations for personalized entertainment items [headphones, diaries, books, etc.], records of experiences [cameras, chargers, extra equipment], communication with friends, relatives, co-workers and receiving news, spaces for gifts and souvenirs to present - 1h);
- Collective or individual assessments (Up to 2h - personality; cognitive profile; depression; stress and anxiety);
- Guided individual interview for initial anamnesis (1h - mental health history, psychotherapy/psychiatry [drug therapy] - physical/emotional trauma and genetic conditions - family history and predispositions - values and motivations - previous experiences related to the activity - bereavement, suicide , panic, psychosis, burnout, aggressiveness, emotional loss, cognitive/performance decay - errors)
- Final exit interview (based on evolution/monitoring indicators, evaluation of experience, leadership, colleagues, oneself, the activity as a whole, critical incidents - 1h);
- Training in safe behavior (From 8h up to 16h - (1. self-care - continuous monitoring (self-knowledge, identification, mood, sleep/wake/work/rest cycle, emotional intelligence); 2. heterocare (interpersonal skills - stimulated sociometry); 3. zeal (emphasis on equipment, tools and critical facilities and survival personnel); 4. reporting (assertive communication and established hierarchical flow); 5. risk and crisis management (simulations and quick responses, PCP and leadership); 6. compliance with standards (rescuing knowledge from contextual training and ERR protocols). For each specific protocol, it is necessary to fill in what are the “triggers or enhancers” of “critical events (specific to each area) that may require ERR to be avoided . In the table below, related to the psychological/psychosocial PROTOCOL:

Conceptual model of safe behavior BDC (Barros-Delben & Cruz)

- Actions for controlled exposure to risk, real or imminente, aimed at preventing the occurrence of undesirable events

1. Comply with safety standards
 - Based on insights from contextual training and ERR protocols.
2. Take care
 - Self-care, continuous monitoring, self-knowledge, identification, burnout, aggressiveness, emotional outburst and cognitive/ performance decay (errors).
3. Take care of others
 - Interpersonal skills, sociometry.
4. Take care of facilities and instruments
 - Context-critical instruments and facilities, personal or provided.
5. Report unsafe aspects
 - Assertive communication and hierarquical reporting flow
6. Manage risks and crises
 - Simulations and quick responses, PCP and leadership.



IDENTIFICATION OF TRIPS OR ENHANCEMENTS

- Emergency situations or disasters and pandemics most likely and with severe risk.
- Negative personal or collective news
- Idiosyncratic aspects - past disorders or conditions - trauma - aspects of human development/genetic elements
- Aspects of interactions with the context - medication - socio-occupational - activity-related, especially alterations

CRITICAL EVENTS THAT MAY REQUIRE ESR

- Suicide ideation/attempt;
- Panic episodes
- Acute stress
- Burnout
- Serious alterations in the sleep-wake cycle (insomnia, hypersomnia, night terrors, sleepwalking) and their cognitive, emotional and psychomotor impacts
- Psychotic episodes
- Violent behavior (harassment and others)
- Emotional outburst
- Grief process (anticipatory)

6. Self-management or remote monitoring of participants and context monitoring for data crossing, with information collected in step B, in the pre-activity (baseline) and others that will be used as guides or comparison of variations over time. Managers must feed the database with information about the context, related to environmental aspects (storms, landslides, earthquakes, climate/temperature, technical/structural failures, etc.), political aspects (situations of wars and conflicts or tensions that may impact context) and the activity itself (delays, advances, important changes and their reasons). In the field of psychology, a list of phenomena and risk factors is compiled and their respective screening instruments for this follow-up and possible automatic feedback for self-management.

7. In the final phase, the participants are also asked to evaluate their experience, their colleagues, managers/leaders, the activity as a whole and will, in turn, be evaluated for the construction of a ranking that can facilitate future selections/calls, restrictions and the improvement of the parts. A new interview may take place, after dismissal, preferably being

interdisciplinary, with a doctor, psychologist, dentist, physical educator and nutritionist, or only with professionals who identify the need.

At the end of the process, the delivery of a report with plotted and summarized information, including risk probability and context risk factors, aptitude recommendations and more accurate preparations, among others, to feed an artificial intelligence that performs predictive statistical calculations and more reliable prescriptive tools, including an alert system with increased response time for crises. This step is foreseen for a postdoc future, or with the manifested interest of agencies/institutions in its immediate implementation and financing.

Final considerations

At the end of March 2022, my mother, who had been fighting cancer for 3 years and had gotten worse in the last 5 months, passed away. She was my friend, my main supporter and inspiration for all my projects, along with my father and brothers. Two weeks later my uncle also passed away, also a victim of cancer. In the meantime I faced cases of suicide in the family and deep depression. I questioned a lot whether I should include these situations in my report, but all of them had a huge impact on my performance, especially my mental health. There were times when I didn't believe it was possible to finish the project and sometimes I still wonder about all of that. Over the last 7 years I have dedicated myself to this proposal, polar psychology in Brazil, there were many expeditions, trips, work and many times I was absent from the presence of those who really mattered. Sometimes I wonder if I did the right thing. The project will not be fully achieved, but although ambitious, a good part of it is completed and about to be successfully completed and I think it is important to add this topic to the report, because, like me, all researchers, at the beginning of their careers or not, are subject to mental health problems and this will inevitably affect their performance. Some more, some less. The fact is, the purpose of this project is exactly that: to try to prevent and control, as far as possible, the risks and risk factors related to human activities, although primarily in remote areas. Aren't we all in hard-to-reach regions at some point? We cannot control all aspects of life, much less death and even if we try, we cannot avoid it and it will impact on everyone's life. The COVID-19 pandemic has brought this issue to light, and just like coping with grief, some challenges can be overwhelming. What makes us move forward? Hopefully the goal of being able to contribute, with our best. My mother, when I said for the first time that I wanted to do research in Antarctica, even before setting foot on the icy continent, just a graduate student with bold dreams and very few resources, coming from public schools and with little advantage over many colleagues who didn't need to divide their days between disciplines and classes and many jobs that could yield some support/ help, she told me: go! And it will work. Just do everything you want with passion and it will work! I'm still trying to figure out what I'm passionate about after all this, but I'll move on, if I can. Considering the delays caused by mourning, also the waves of COVID-19 in the country and cuts in investments in the areas of social sciences by the current government, the situation of tension regarding the actions, part of its project has changed. The proposed program is now finalized, taking into account the concerns of both PROPOLAR and PROANTAR, in particular regarding the security of the collected data, also the interest of project leaders and program managers, in addition to medical expeditions and adventures to different contexts. similar, and space simulation, to put into practice in the Post-Doc the software requires, tool to support the program, after the master's defense, scheduled for March 2023. Seeks to establish and strengthen partnerships and cooperation with armed forces, programs and leaders of national and international projects who see in this initiative mechanisms that can,

as shown in the figure, reduce costs with activities in remote areas, especially the polar ones. The grant was essential to continue the project, strengthen ties between international and national partners and envision possibilities for advances and contributions.

Thanks a lot

I hope everyone has an excellent 2023 and if possible, I keep dreaming of continuing the project/research, if in fact you have something to contribute.

Spending report as to how the funds were used

<i>Item</i>	<i>Quant.</i>	<i>Unitary value (US\$)</i>	<i>Total value (US\$)</i>
<i>Tickets</i>	<i>2</i>	<i>800,00</i>	<i>1.600,00</i>
<i>Accommodation - Lisbon (Portugal)</i>	<i>1 (project - month)</i>	<i>2.500,00</i>	<i>4.900,00</i>
<i>Expenses per day - Lisbon (Portugal)</i>	<i>1 (projetc - month)</i>	<i>2.500,00</i>	<i>2.500,00</i>
Total			9.000,00
<i>Security, translate, documents, training, and others (personal investments or Universities). In addition, startup Polar Sapiens already offers additional support, offering the application's source code as a basis for improving the specifics of the ICE context, resources could exceed \$3,000, including costs with team to field collect.</i>			<i>6.000,00</i>