Corso di Dottorato di Ricerca in Scienze della Vita e dell'Ambiente - Ciclo XXXVII

Coordinating Search and Rescue activities (SAR) at sea

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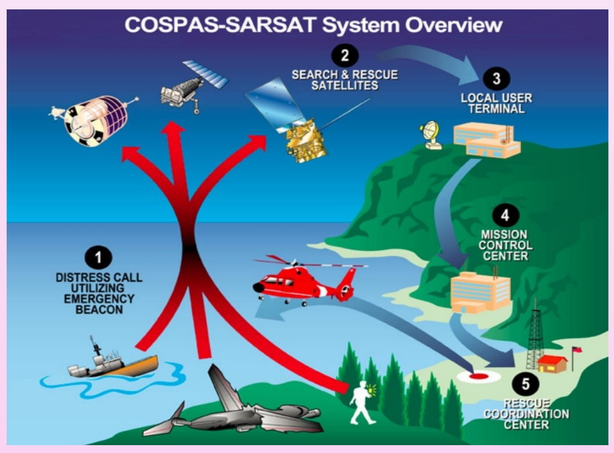
Introduction



The "1979 UN International Convention on Maritime Search and Rescue - SAR" defines "Search" all those operations aimed at locating people that are in distress or immediate danger, and "Rescue" those operations aimed at recovering people in danger and providing them with medical first aid or any other care and support they may need. SAR operations are usually carried out by the Coast Guard and various other actors, including nongovernmental and volunteer organizations. Worldwide SAR protocols have been developed over the years from the lessons learned in real emergencies and drills and training exercises. For example, Maritime Incident Response Groups (MIRG) have been established in Northern Europe with the purpose to provide help to the crew of the ship in distress. In Italy the MIRG approach is being discussed, it is yet at the proposition stage. This Ph.D. project purposed to investigate the applicability of such models in the Italian emergency response system.

Methodology and preliminary results

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
Responsability * Master	Between Groups	(Combined)	0,064	1	0,064	0,027	0,871
	Within Groups		91,436	38	2,406		
	Total		91,500	39			
Decision * Master	Between Groups	(Combined)	0,157	1	0,157	0,188	0,667
	Within Groups		31,818	38	0,837		
	Total		31,975	39			
External help * Master	Between Groups	(Combined)	1,078	1	1,078	0,855	0,361
	Within Groups		47,897	38	1,260		
	Total		48,975	39			
Collaboration * Master	Between Groups	(Combined)	0,026	1	0,026	0,020	0,887
	Within Groups		47,749	38	1,257		
	Total		47,775	39			
Training * Master	Between Groups	(Combined)	0,256	1	0,256	0,188	0,667
	Within Groups		51,744	38	1,362		
	Total		52,000	39			
Background * Master	Between Groups	(Combined)	3,201	1	3,201	1,949	0,171
	Within Groups		62,399	38	1,642		
	Total		65,600	39			

1. Anova table showing no major differences between Mariners groups (Sig. > 0.05).

This research aims at clarifying different aspects of SAR at sea, covering the technical issues, but also correlating them with socio-cultural perspectives, which govern response mitigation, preparation and response in a very multicultural environment. Analysis have been designed to:

- Deepen our understanding of the SAR at sea procedures in Italy;
- Compare such state of the art with that of other more advanced countries;
- Understand role and authority of the Commander of a ship in distress;
- Understand the modus operandi of MIRG rescue teams;
- Develop a specific disaster management model for maritime maxi-emergencies.

Interdisciplinary methodologies and multi-scale analysis have been applied to explore the different dimensions of the issue. During the first phase I gathered the available institutional and legal documents, produced at a national and an international level, to acquire insight of the legal framework regulating jurisdiction, rule of engagement, hierarchies and responsibilities of SAR at sea operations. In Italy, the Coast Guard coordinates SAR activities through a "National Maritime SAR Plan" based on international regulations (IAMSAR). Despite huge progresses over time in terms of SAR methodologies and overall approach, incidents still happen; see for example the Costa Concordia in Italy or the Rena in New Zealand. In an increasing complicated navigation industry (new technologies/vessel traffic), SAR requires increasingly sophisticated skills and multidisciplinary knowledge.

Correlations

			External help Master	Collaboration	Training	Shared knowledge	Communication	External help Crew
Spearman's rho	External help Master	Correlation Coefficient	1,000	0,057	0,320	0,253	0,277	-0,140
		Sig. (2-tailed)		0,796	0,137	0,243	0,200	0,523
		N	23	23	23	23	23	23
	Collaboration	Correlation Coefficient	0,057	1,000	,485*	0,380	0,327	0,216
		Sig. (2-tailed)	0,796		0,019	0,073	0,128	0,323
		N	23	23	23	23	23	23
	Training	Correlation Coefficient	0,320	,485*	1,000	,584**	,431*	,540**
		Sig. (2-tailed)	0,137	0,019		0,003	0,040	0,008
		N	23	23	23	23	23	23
	Shared knowledge	Correlation Coefficient	0,253	0,380	,584**	1,000	,704**	0,409
		Sig. (2-tailed)	0,243	0,073	0,003		0,000	0,053
		N	23	23	23	23	23	23
	Communication	Correlation Coefficient	0,277	0,327	,431*	,704**	1,000	0,357
		Sig. (2-tailed)	0,200	0,128	0,040	0,000		0,095
		N	23	23	23	23	23	23
	External help Crew	Correlation Coefficient	-0,140	0,216	,540**	0,409	0,357	1,000
		Sig. (2-tailed)	0,523	0,323	0,008	0,053	0,095	
		N	23	23	23	23	23	23

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

2. Spearman Table: Rescue team.
Correlations between listed features; green boxes > high value.

Correlations

			Responsability	Decision	External help	Collaboration	Training	Background
Spearman's rho	Responsability	Correlation Coefficient	1,000	0,057	0,219	0,131	,340*	,313*
		Sig. (2-tailed)		0,726	0,174	0,421	0,032	0,049
		N	40	40	40	40	40	40
	Decision	Correlation Coefficient	0,057	1,000	0,241	0,308	-0,003	0,229
		Sig. (2-tailed)	0,726		0,134	0,053	0,984	0,154
		N	40	40	40	40	40	40
	External help	Correlation Coefficient	0,219	0,241	1,000	,460**	0,309	0,246
		Sig. (2-tailed)	0,174	0,134		0,003	0,052	0,126
		N	40	40	40	40	40	40
	Collaboration	Correlation Coefficient	0,131	0,308	,460**	1,000	,454**	,400*
		Sig. (2-tailed)	0,421	0,053	0,003		0,003	0,011
		N	40	40	40	40	40	40
	Training	Correlation Coefficient	,340*	-0,003	0,309	,454**	1,000	,357*
		Sig. (2-tailed)	0,032	0,984	0,052	0,003		0,024
		N	40	40	40	40	40	40
	Background	Correlation Coefficient	,313*	0,229	0,246	,400*	,357*	1,000
		Sig. (2-tailed)	0,049	0,154	0,126	0,011	0,024	
		N	40	40	40	40	40	40

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

3. Spearman Table: Master. Correlations between listed features; green boxes > high value.

The second phase, which is still ongoing, but almost concluded, consists of interviews and questionnaires to captains and crew members to assess perceptions and point of views of the various individuals involved in the SAR and MIRG operations, i.e., sector experts, Commanders of the ship and members of Rescue Teams. The analysis of the collected data is being performed with SPSS (Statistical Package for Social Science), is highlighting the relationship between professional backgrounds and perception of the limits and potentials of a MIRG approach in an international context such as SAR at sea. Results, visible in the tables 1,2 and 3, confirm the initial hypothesis and highlights a common call/request for:

- "shared training" of MIRG with Ship Commanders from different geographical areas to enhance collaboration and cultural understanding.
- Common "communication protocols and shared knowledge"

The above-described data collection and analysis will be replicated with Italian Masters and rescue teams, to highlight similarities and differences to inform and help designing a framework to implement a MIRG approach in the Italian peculiar context (e.g. Migrant boats in the Mediterranean, etc)

Next steps: drills and training exercises

Floating Storage Regasification Unit moored in Piombino.

- In June 2024 I will participate at LIVEX 2024, an international training exercise in Amsterdam with the MIRG of Rotterdam and the Dutch Coast Guard (https://reddingopzee.nl/over-de-livex/livex-2024). This training is performed every five years, simulating a complex Mass Rescue Operation.
- At the end of 2024 it is also planned a visit to the MIRG base in Stockholm (Sweden) and to the Research institutes of Sweden - RI.SE. (https://www.ri.se/en).
- I am working also on the planning of the second training exercise at the Port of Piombino where a Floating Storage Regasification Unit (FSRU) is moored (see picture on the left). This unit perform a strategic role during times of international unrest, transforming the liquefied natural gas (LNG) gas into ready to use methane. During the drill I will observe and assess the emergency procedures including the aspects related to communication, organization as well as the interaction among the different teams (thus evaluating the the professional culture divides).
- Additionally, I am still hoping in a timely implementation of an already planned, yet postponed, official MIRG exercise engaging the Italian Fire Service and the Italian coast guard, with the support of the Italian Navy, as in Northern Europe.

References:

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