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**Mediterranean Network (MedNet) - Overview of the regulatory  
infrastructure for the safe transport of radioactive material**

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**Abstract**

In order to promote more effective interaction and coordination between competent authorities at a working level, a first Mediterranean Network (MedNet) for the safe transport of radioactive material was created with the support of the IAEA and funding provided by the European Union. MedNet has already provided a platform for sharing information among experts, promoting best practices, identifying areas for building capacity, establishing working links and approving common guidance material. The ultimate goal is to ensure harmonization and continuous improvement in radiation and transport safety globally.

The evolution of the MedNet and its activities correlate directly with the regulatory infrastructure for the safe transport of radioactive material in the Mediterranean region and the priorities defined by the participating Member States (MSs). Actions have been decided and are under implementation at national and regional levels, based on the findings of the self assessments and peer-reviews performed by the involved MSs. Specific issues, such as emergency preparedness and response (EPR) for maritime transport of radioactive materials, were raised as main concerns, since the very first meetings of the network. Strengths, Weaknesses, Opportunities and Threats (SWOT) analyses were carried out in an effort to assess the overall situation, concerning the safe transport of radioactive materials, in the Mediterranean region and determine the added value of harmonized approaches and regional cooperation. The MedNet progress, the overview of the SWOT analyses results and conclusions will be discussed in this paper.

## **Introduction**

The Mediterranean Transport Safety Network (MedNet) was established under Project C.3 “Strengthening of an effective compliance assurance regime in transport of radioactive material in the European Southern neighborhood region (Mediterranean Sea) and associated shipping states” of the EC-IAEA Cooperation in the Field of Nuclear Safety, Contribution Agreement 2013/313-757. Since Q4 2013, several face to face and virtual meetings and communications via electronic means resulted in the existing working platform between the Competent Authorities (CAs) responsible for the transport of radioactive material (RAM) in the region. It is worth mentioning that the MedNet leadership structure has been in place since October 2015.

Member States (MSs) that have participated in MedNet meetings are: Albania, Algeria, Bosnia and Herzegovina, Croatia, Egypt, Greece, Jordan, Lebanon, Malta, Montenegro, Morocco, Portugal, Romania\*, Serbia, Slovakia\*, Slovenia, The former Yugoslav Republic of Macedonia, The Syrian Arab Republic, Tunisia and Turkey.

A product of collaboration between network members, namely guidance material for notification or approval of radioactive material (RAM) shipments (import-export-transit), was issued in February 2016. The aim of this study is to assess current benefits, to identify areas for building capacity and the potential challenges for the sustainability of the network in the future.

## **Materials and Methods**

Data used in this study was obtained through the dedicated SharePoint site in IAEA Global Nuclear Safety and Security Network (GNSSN) for the MedNet and concerns national action plans, country presentations and Radiation and Waste Safety Infrastructure Profiles through the Radiation Safety Information Management System (RASIMS) Thematic Safety Area 7 (TSA-7), for Transport Safety. A Strength, Weakness, Opportunities, and Threat (SWOT) analyses [see Figure 1] against the 12 elements of the compliance assurance circle [see Figure 2] proposed in IAEA Safety Guide TS-G-1.5, *Compliance Assurance for the Safe Transport of Radioactive Material*, was performed.

The aforementioned data corresponds to 47% of the MedNet Member States (MSs) and covers the period Q4 2013 - Q3 2015. MSs participation in physical meetings was assessed using administrative data (i.e., lists of participants in meetings in the period Q4 2013 - Q2 2016). National CAs response (%) to communication via electronic means (e-communication) was estimated by the individuals primarily exchanging e-mails with the participants, i.e. MedNet’s chairperson and the IAEA contact point (Technical Officer).

\* Neighbouring countries have been participated on an ad-hoc basis to MedNet meetings.

# SWOT ANALYSIS



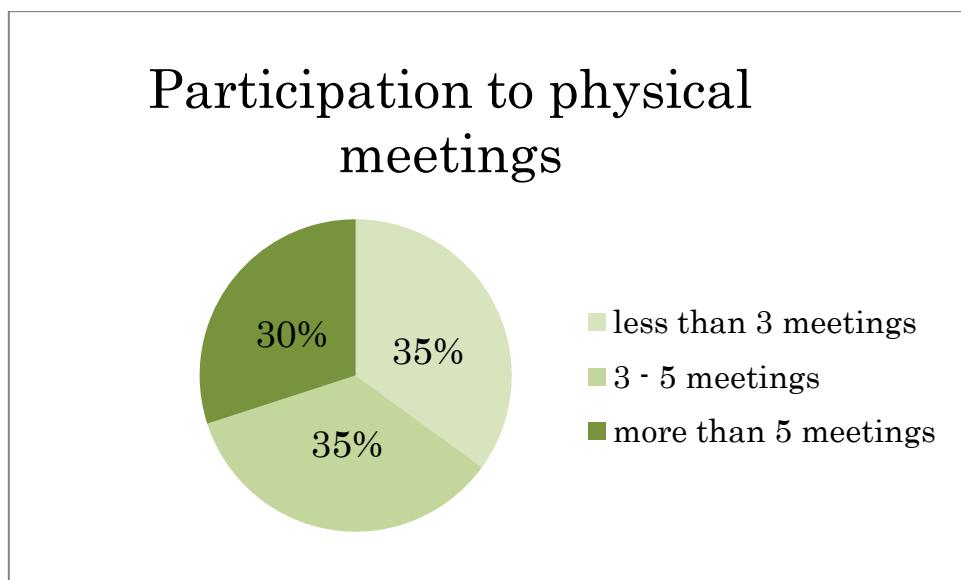
Figure 1 Overview of SWOT analysis



Figure 2 Compliance assurance circle, IAEA Safety Guide TS-G-1.5

## Results and Discussion

The participation of MSs to physical meetings conducted in the region and in IAEA headquarters in Vienna (7 in total) appears quiet balanced [see Figure 3]. The frequent meetings in the network's emerging phase resulted to the establishment of working links, which are expected to be enhanced in the future.



**Figure 3 MedNet Member States participation (%) to physical meetings organized by IAEA in the period Q4 2013 to Q2 2016**

National CAs response to e-communication seems to indicate that there are opportunities for improvement [see Table 1]. The fact that the “high/excellent” response to e-communication appears higher for contacts with IAEA could relate to requests for administrative issues in case of MSs that recently joined the network. In the majority of MSs, good correlation appears between physical and electronic co-operation. It is noted that while preparing the current paper, the involved MedNet participants’ response to e-communication remarkably improve compared to the findings presented in Table 1.

**Table 1 National CAs response (%) to communication via electronic means**

Response to e-communication	MedNet members among themselves	MedNet members - IAEA
none/very low	41%	24%
low/medium	41%	41%
high/excellent	18%	35%

The use of e-tools for regular and low cost collaboration (e.g. virtual meetings) anticipates improving, as soon as internet connection issues, observed in some cases, resolve.

Strengths (S), weaknesses (W), opportunities (O) and threats (T) against the 12 elements of the compliance assurance circle have been identified and are presented in Table 2.

### Elements 1, 2 & 3

Considering that design, testing or manufacturing facilities do not exist in the vast majority of MedNet MSs to date, lack of relevant expertise has been identified; national CAs haven't developed technical procedures to assess designs or witness the appropriate manufacturing and testing. If a relevant necessity appears in the future, technical assistance could be requested from colleagues of other regional networks for the safe transport of RAM and/or the CA of the package design approval. However, if organizations within a MS decide to proceed with designing, manufacturing or testing, the necessity for in state expertise need to be thoroughly addressed.

### Element 4

Lack of expertise in examining maintenance and servicing of reusable packages seems to be the case in the MedNet MSs analyzed in this work, given that these activities are carried out abroad. The responsibility of proving the proper maintenance and servicing of packages is assigned to the operator, who is requested to submit to national CAs a valid certificate issued by the country of origin. Provisions for assessing the integrity and safety of re-usable packages need to be implemented.

### Element 5

Although national CAs are empowered to exercise regulatory control for transport operations, field inspections, wherever conducted, seem to be limited to carriers premises. In several MedNet MSs included in the current analysis, monitoring and inspection of RAM transport appear to consist of review and assessment of documentation submitted to the national CA, as well as verification of the package proper labeling. Given that the European Association of Competent Authorities for the safe transport of RAM (EACA) Technical Guide for Compliance Inspections has already been reviewed by the network, the CA's in the region have been encouraged to use the prepared inspection checklists as templates and create national checklists as per the MS's needs, while implementing actions for enhancing regulatory oversight. It is noted that training for carrying out inspections has been identified and addressed during the first phase of the project.

### Element 6

Regarding enforcement actions and investigation of incidents, it appears that regulatory provisions are in place; in a few cases, governmental approval for strengthening enforcement powers is still pending. Defining incident/accident reporting requirements and levels for intervention of authorized experts, as well as providing guidance to consignors, carries etc, could serve as a tool for raising awareness and optimizing resources allocation at national level.

### Element 7

It is identified that national emergency response & preparedness (EPR) and CBRN plans although generally in place, are not tested and verified in all MedNet MSs. Carriers are requested to have their own EPR plans that are submitted for approval to national CAs as part of the authorization process. Regular organization of emergency exercises requires engagement of significant human

and technical resources; however offers valuable insight, such as clarification of jurisdiction between involved entities and identification of weaknesses. At regional level, EPR for maritime transport of RAM has been one the main concerns raised since the very first meetings of the network. Existing experience at regional and interregional level and any living examples in other regions could provide critical input.

#### Elements 8, 9 & 10

International conventions and treaties concerning the transport of dangerous goods seem to be ratified. National CAs that share competencies for the transport of dangerous goods are identified. In general, national regulations require that workers involved in RAM transport have adequate training in radiation safety, which is assessed by national CAs in the authorization process. Competence in the safe transport of RAM specific training and provisions for training content or re-training requirements appear unavailable in the majority of MedNet MSs analyzed. Although information dissemination via national CAs websites is conducted in some MSs, a relatively efficient infrastructure appears unavailable in several cases.

Regulatory provisions and procedures for issuing approvals for RAM shipments are in place. It appears that MedNet MSs included in the current analysis have no expertise in issuing approval certificates for package designs, special form radioactive materials etc., given that, as already mentioned, design, testing or manufacturing facilities and package maintenance-servicing activities are not present.

The review and revision of regulatory framework currently carried out in several MSs provides the opportunity, either to update and improve the existing regulations, or to endorse RAM safe transport specific regulations, including among others, training requirements and issuing of approvals not already addressed.

#### Element 11

In several of the MedNet MSs analyzed, MoUs already signed between some of the authorities that share competencies seems to indicate that co-operation and inter-departmental liaison exist. It is well known that when collaboration at national level is optimized, effective coordination of regulatory functions is enabled. The adopted MoU approach could be reviewed, updated and wherever applicable extended, in order to involve all transport modes. Such MoUs should provide for the creation of procedures for the handling of authorized, undeclared or illicit shipments. MedNet has already provided appropriate ground for active representation at international level; an area that several MSs in the region seem unable to individually promote due to lack of resources.

#### Element 12

Audits of management systems are identified as an area for building capacity. Only one national CA, among the ones analyzed in this work, has established and accredited an integrated management system (IMS). Generally speaking, provisions and programs for auditing the management systems of organizations involved in RAM transport are not in place. As a starting point, the organization of a training course or workshop focusing solely on management systems

seems necessary. Moreover, existing experience at regional and interregional level could offer significant added value.

**Table 2 SWOT analysis against IAEA TSG 1.5 compliance assurance circle elements**

<b>Elements 1, 2 &amp; 3 Design Assessment &amp; Witnessing of Testing/Manufacture</b>	
S	Not identified.
W	Lack of expertise. Technical procedures not available.
O	Identification of potential entities at national level. Competence & expertise available in other regional networks – technical assistance and training. Provisions for packages not requiring CA approval.
T	Not identified.
<b>Element 4. Examination of Maintenance &amp; Servicing</b>	
S	Proper maintenance & servicing documentation/records required in some MSs.
W	Lack of expertise. Valid certificate issued by the country of origin reviewed by national CAs.
O	Adequate procedures to ensure the safety of reusable packages.
T	Not identified.
<b>Element 5. Monitoring &amp; Inspection of Transport Operations</b>	
S	Regulatory provisions in place. EACA Technical Guide for Compliance Inspections checklists used in one MS.
W	Lack of inspection checklists in several cases. Awareness of transport regulations, management system, radiation protection programs, emergency arrangements, security provisions not included in inspection procedures in several cases.
O	Review of procedures - preparation of inspection checklists. Training of inspectors – joint inspections in collaboration with other regional networks.
T	Administrative changes at national level. Other national competent authorities for the transport of dangerous goods.
<b>Element 6. Enforcements Actions &amp; Investigation of Incidents</b>	
S	Regulatory provisions in place.
W	Strengthening of enforcement powers pending Government approval in some cases.
O	Review of procedures - preparation of appropriate checklists. Raise carriers' awareness.
T	Administrative changes at national level. Other national competent authorities for the transport of dangerous goods.

<b>Element 7. Emergency Planning &amp; Exercises</b>	
S	National EPR & CBRN plans generally in place. Carriers requested to have their own EPR plans.
W	RAM transport emergencies not always explicitly mentioned in national plans. Emergency exercises not carried out in several cases.
O	Test & verify existing EPR plans. Competence & experience available within MedNet and in other regional networks.
T	Administrative changes at national level. Possibility of confusion on jurisdiction between involved entities.
<b>Element 8. Regulatory Review &amp; Maintenance of Effective Legal Framework</b>	
S	International conventions, treaties etc ratified. National CAs identified. New independent CA recently established in one MS.
W	Specific regulations for the safe transport of RAM pending endorsement in some cases.
O	Legislative & regulatory documents currently under review & revision.
T	Administrative changes at national level. Possibility of confusion on jurisdiction between involved entities.
<b>Element 9. Training and Distribution of Information</b>	
S	Regulatory provisions for radiation safety training in place. ADR training requirements apply in some MSs. Training assessed in the authorization process.
W	Lack of trainers competent in RAM transport and no infrastructure for information distribution in several cases.
O	Legislative & regulatory documents currently under review and revision. Competence & experience available within MedNet and in other regional networks.
T	Administrative changes at national level.
<b>Element 10. Issuing of Approvals</b>	
S	Not identified.
W	No expertise in issuing approval certificates for package designs, special form RAM etc.
O	Legislative & regulatory documents currently under review and revision. Competence & expertise available in other regional networks – technical assistance and training.
T	Not identified.
<b>Element 11. Inter-departmental Liaison / Co-operation</b>	
S	Co-operation mostly through MoUs at national level in several MSs.
W	Limited representation of several MSs at international level.



O	Review, update and extend MoU approach.
T	Administrative changes at national level.
<b>Element 12. Audits of Management Systems</b>	
S	Not identified.
W	Provisions and procedures for auditing management systems generally not in place. IMS established and accredited in only one national CA.
O	Competence and experience available within MedNet and in other regional networks.
T	Not identified.

## Conclusions

The fact that administrative changes at national level have been identified by the authors as a threat for several elements [see Table 2], indicates that actions to reassure or improve co-operation at national level and the regulatory review and maintenance of an effective legal framework, are of significant importance. Regional and interregional co-operation, in terms of sharing relevant good practices and existing experience, could significantly contribute to resolve several of the identified weaknesses.

The regular monitoring of key indicators like the ones assessed in this work, namely correlation between participation in physical meetings and response to e-communication, as well as the SWOT analyses findings, will eventually offer a valuable insight for the MedNet future performance and an overview of regional cooperation's added value in radiation and transport safety.

## Acknowledgments

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## Note

The authors performed the analysis of the data submitted by the MedNet Member States and are only responsible for the data of their own countries.

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4. <https://gnssn.iaea.org/main/Med-Net/Pages/default.aspx> (with proviso for opening soon).