

A man in a dark suit and light-colored shirt is falling through the air, arms outstretched, against a blue sky with scattered white clouds. The image is used as a background for the text.

Advanced check:

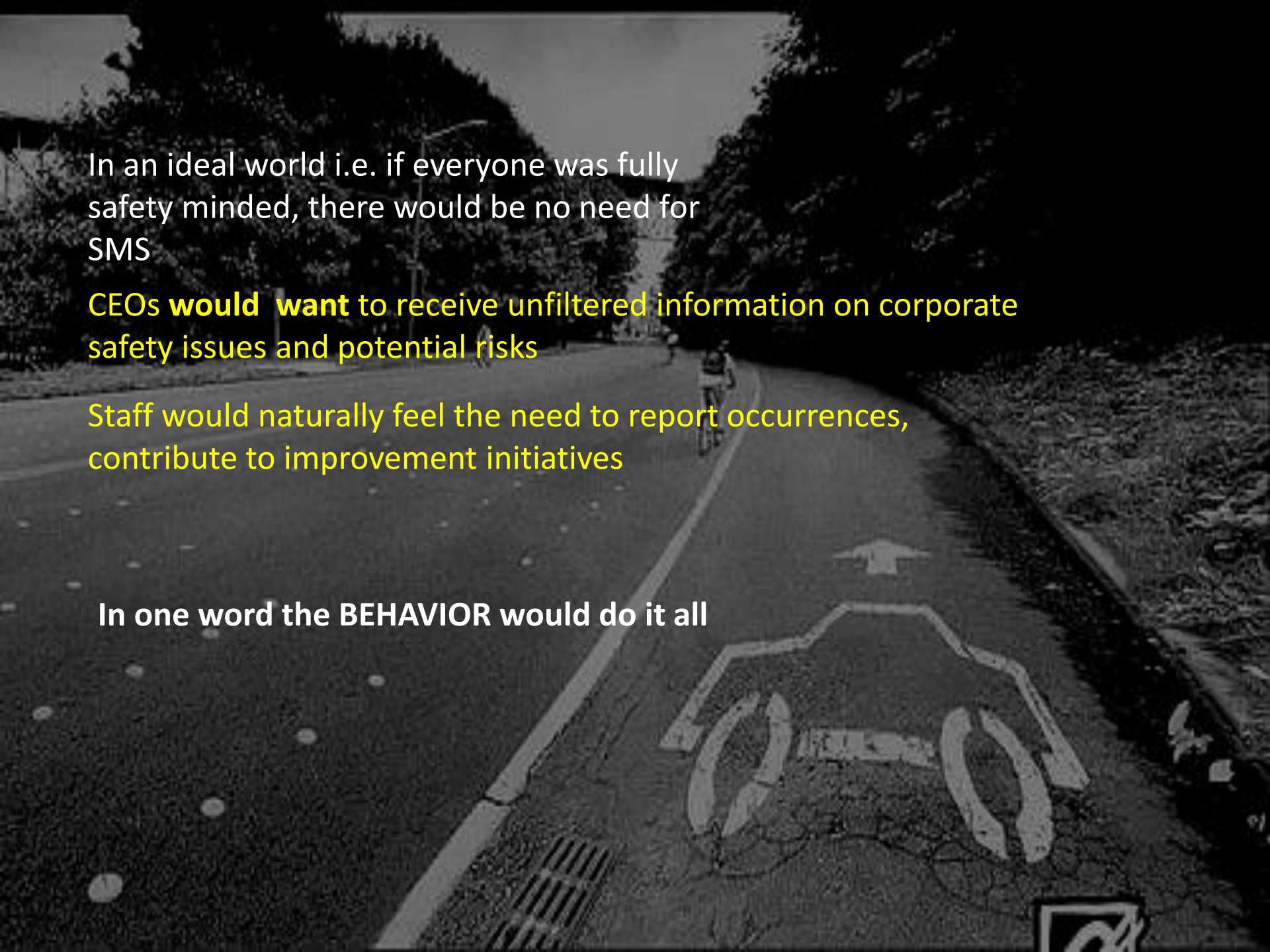
Where are we wrt

“certification”?

Tool and example

Tony LICU-Gilles LE GALO

ESP Programme Manager

A grayscale photograph of a tree-lined road. In the foreground, a white arrow points forward on the pavement, and below it is a speed limit sign showing the number 20. The road is flanked by trees and a sidewalk on the right. In the distance, a few people are walking on the path.

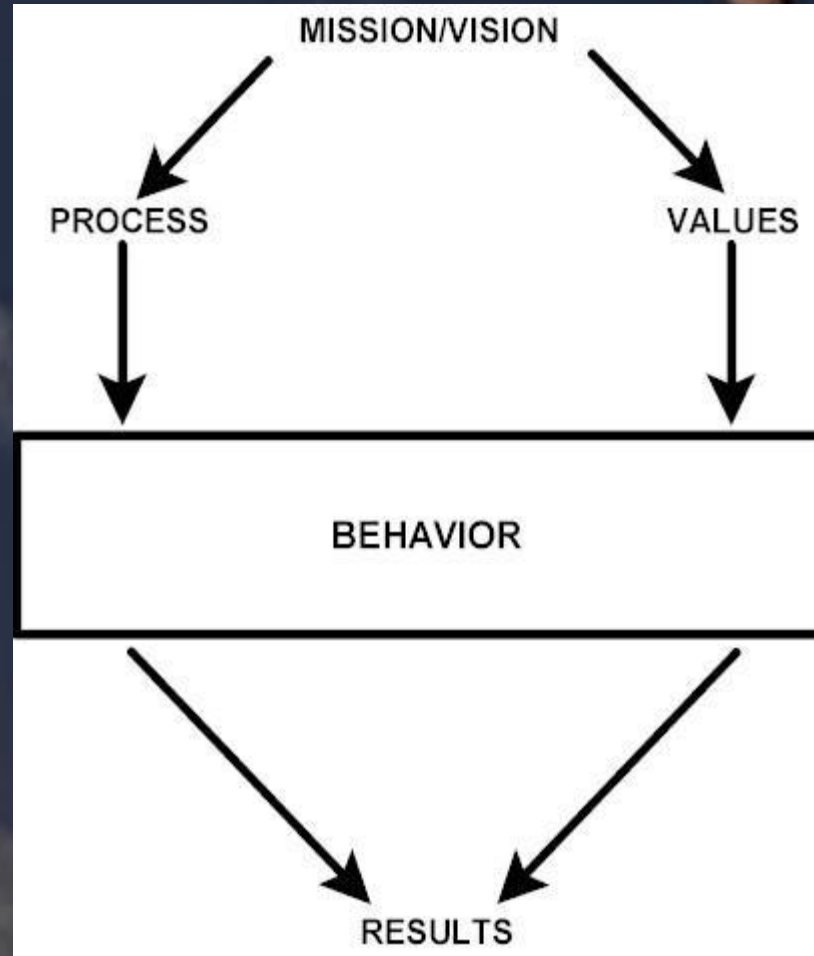
In an ideal world i.e. if everyone was fully safety minded, there would be no need for SMS

CEOs **would want** to receive unfiltered information on corporate safety issues and potential risks

Staff would naturally feel the need to report occurrences, contribute to improvement initiatives

In one word the **BEHAVIOR** would do it all

This is not the case so SMS must be supported by processes whilst developing its culture, in such a way the behavior is made of “mandatory” activities together with the culture existing at one moment in time in the company



A man in a dark suit and light-colored shirt is falling through a blue sky with scattered white clouds. He is in a horizontal position with his arms outstretched and a look of surprise or concern on his face. The background is a vast, open sky with soft, white clouds.

**How can these two dimensions
be captured by a survey?**

The Transport Canada Approach

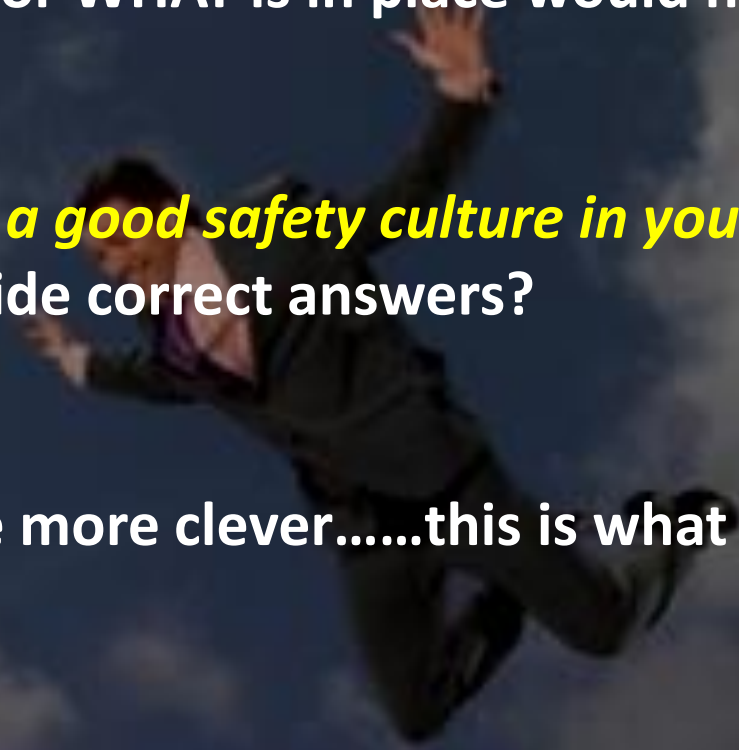
Classical approach looking for WHAT is in place would not work

Would asking ***“do you have a good safety culture in your mind”*** be a question likely to provide correct answers?

Only works for material

So the questions have to be more clever.....this is what Transport Canada has done

See an example



Principles of the approach

1. Describe precisely what you would wish to see or hear from auditees: **the EXPECTATIONS**

Expectations-Table B 1.1 – Safety Policy

Component	1.	Safety Management System Implementation
Element	1.1	Safety Policy
<p>Expectations</p> <ul style="list-style-type: none">▪ A safety policy is in existence.▪ The organisation has based its safety management system on the safety policy.▪ The safety policy is appropriate to the size and complexity of the organisation.▪ The safety policy states the organisation's intentions, management principles and commitment to continuous improvement in the safety level.▪ The safety policy is approved by the accountable executive.▪ The safety policy is promoted by the accountable executive.▪ The safety policy is reviewed periodically.▪ The safety policy includes a commitment to involve personnel at all levels in the establishment of the safety management system.▪ The safety policy includes a commitment to involve personnel at all levels in the maintenance of the safety management system.▪ The safety policy is communicated to all employees with the intent that they are made aware of their individual safety obligations.▪ There is a clear declaration of commitment to safety.▪ Senior management has a clear commitment to safety.▪ Senior management demonstrates their commitment to safety through active and visible participation in the safety management system.▪ The policy is implemented at all levels of the organisation.▪ The policy is clearly visible to all personnel and particularly throughout the safety-critical areas of the organisation.▪ The policy is included in key documentation and communication media.▪ Senior managers clearly articulate the importance of safety when addressing company personnel.▪ Verification that personnel have understood the message.▪ Senior executives have made a commitment to the development and ongoing improvement of the safety management system.		

cultural

cultural

understanding

Principles of the approach

2. Develop questions that look for cultural background and/or understanding: **the QUESTIONS**

Component	1.	Safety Management Plan
Element	1.1	Safety Policy
Questions To the accountable executive: How would you summarise your safety philosophy and expectations from your company's safety management system? Are there any particular SMS policy initiatives with which you or your senior management are personally identified (show me) How do you communicate your SMS performance expectations to the organisation? Are there any specific SMS issues that you expect to have a significant impact on your company's performance? How often do you critically review the standing SMS policy? Who is involved in this review? How do you assess the extent to which safety policy and SMS processes are understood within your company? How do you measure your company's SMS performance? How is the information from these performance appraisals used? How has your safety policy influenced the development of your safety management system? Show me an example. To functional department heads: What expectations does your employer have with respect to you and your department's SMS performance? How are these expectations communicated to you? Can you explain your role in the development of your safety obligations and your department's SMS performance criteria? How do you communicate SMS processes/obligations to personnel within your department? How do you assess the extent to which safety policy and SMS processes/obligations are understood within your department? How are employees involved in the maintenance of the SMS? To employees: What is your understanding of management's expectations of you with respect to company SMS performance? How would you characterise management's commitment to strong SMS performance? How does management make you aware of the relationship between the safety policy and different safety initiatives?		

No question to the Safety Manager

Open ended questions

Principles of the approach

3. Use of a scoring system: **the RESULTS**

Score-Table D 1.1 Safety Policy

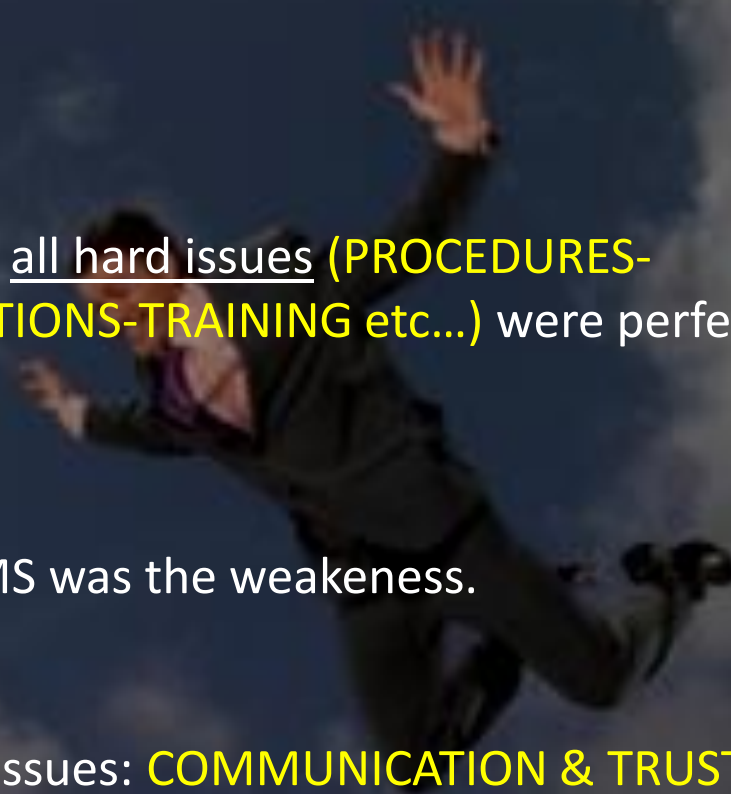
Score	Criteria
1	Senior management does not demonstrate commitment to a SMS. Safety policies are not well developed and most personnel are not involved in SMS.
2	(3) less some aspects
3	A.A safety policy is in existence and appropriate to the size and complexity of the organisation. B.The organisation has based its safety management system on the safety policy. C.The safety policy is approved by the accountable executive. D.The safety policy is promoted by the accountable executive. E.The safety policy is reviewed periodically. F.The safety policy is communicated to all employees with the intent that they are made aware of their individual safety obligations.
4	All of (3) plus some aspects of (5)
5	All of 3 plus all of the following: There is a clear declaration of commitment to safety. The safety policy states the organisation's intentions, management principles and commitment to continuous improvement in the safety level. Senior management has a clear commitment to safety and demonstrates it through active and visible participation in the safety management system. Personnel at all levels are involved in the establishment and maintenance of the safety management system. The policy is implemented at all levels of the organisation. The policy is clearly visible o all personnel and particularly throughout the safety-critical areas of the organisation. The policy is included in key documentation and communication media. Senior managers clearly articulate the importance of safety when addressing company personnel. Verification that personnel have understood the message. Commitment of the organisation's senior executives to the development and ongoing improvement of the safety management system.

Experience of using the tool

In one organisation surveyed, all hard issues (PROCEDURES-ORGANISATION-JOB DESCRIPTIONS-TRAINING etc...) were perfectly addressed and covered

BUT the other “leg” of the SMS was the weakness.

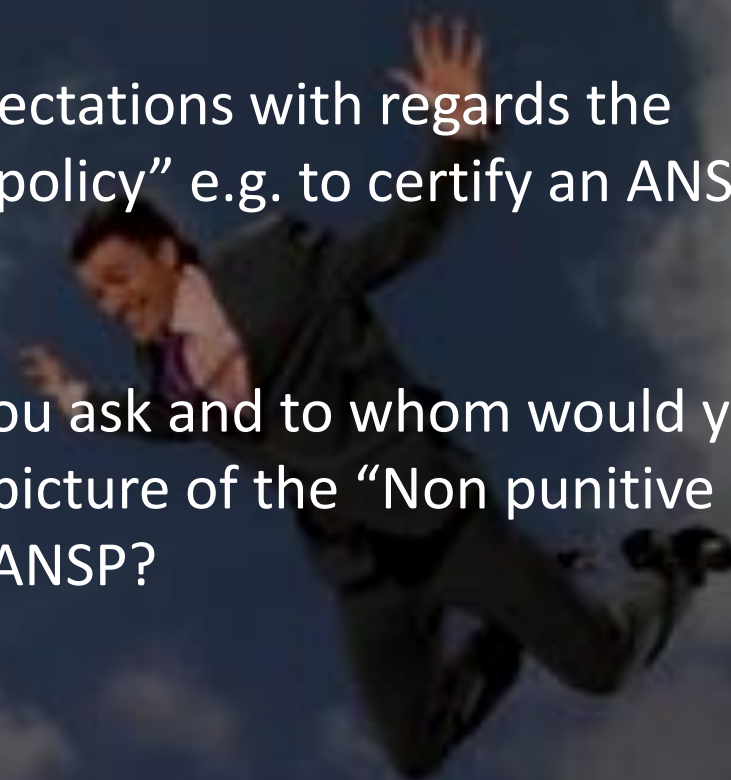
The Survey revealed the soft issues: COMMUNICATION & TRUST



An exercise?

What would be your expectations with regards the “Non punitive reporting policy” e.g. to certify an ANSP?

What questions would you ask and to whom would you address them to build a picture of the “Non punitive reporting policy” at this ANSP?



Expectations

Element	1.2 Non-Punitive SMS Safety Reporting Policy
----------------	--

Expectations

- | |
|---|
| <ul style="list-style-type: none">• There is a policy in place that provides immunity from disciplinary action for employees that report safety deficiencies, hazards or occurrences.• Conditions under which punitive disciplinary action would be considered (e.g. illegal activity, negligence or willful misconduct) are clearly defined.• The policy is widely understood within the organization.• The organizations have letters of understanding between employees and/or third party contractors and management to document the disciplinary policy, and the manner in which it will be implemented.• Personnel express confidence and trust in the policy.• There is concrete evidence that the organization is applying the non-punitive safety reporting policy. |
|---|

Questions

Element	1.2 Non-Punitive Safety Reporting Policy
Questions	
To accountable executive and department heads:	
(A)	Can you describe the disciplinary policy in regards to the SMS reporting system? Is it non punitive?
(BP)	How do you ensure that employees understand the policy?
(BP)	Has the organization established the conditions under which disciplinary action would be considered? (show me) How do you know that this is clearly understood by the personnel?
(BP)	Are there any formalized documents, such as letters of understanding, between employee groups / third party contractors and management?
To employees:	
(A)	Do you feel confident reporting safety deficiencies, hazards and occurrences? Explain

So definitely the questions are not limited to a “Do you have a non punitive reporting policy?” (if yes show me)

Scoring

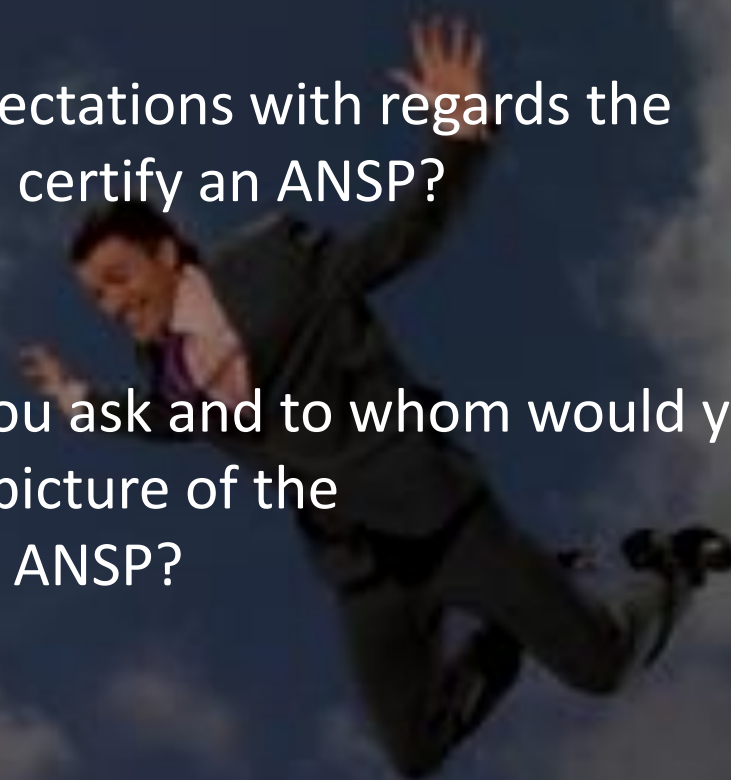
Table D1.2 – Safety Management Plan – Non-Punitive Safety Reporting Policy

Score	Criteria
1	Safety-related reports or inadvertent errors result in punitive action being taken against individuals.
2	(3) less some aspects
3	A. There is a policy in place that provides immunity from disciplinary action for employees that report safety deficiencies, hazards or occurrences.
4	All of (3) plus some aspects of (5)
5	<p>All of 3, plus all of the following:</p> <p>Conditions under which punitive disciplinary action would be considered (e.g. illegal activity, negligence or willful misconduct) are clearly defined and documented.</p> <p>The policy is widely understood within the organization.</p> <p>The organizations have letters of understanding between employees and/or third party contractors and management. The purpose of these letters is to document the disciplinary policy, and the manner in which it will be implemented.</p> <p>Personnel express confidence and trust in the policy.</p> <p>There is concrete evidence that the organization is applying the policy.</p>

An exercise?

What would be your expectations with regards the “Communication” e.g. to certify an ANSP?

What questions would you ask and to whom would you address them to build a picture of the “Communication” at this ANSP?



Expectations

Element	1.4 Communication
Expectations	
<ul style="list-style-type: none">• There are communication processes in place within the organization that permit the safety management system to function effectively.• Communication processes are commensurate with the size and scope of the organization. (written, meetings, electronic, etc.)• SMS information is established and maintained in a suitable medium that provides direction in related documents.• There is a process for the dissemination of safety information throughout the organization.• There is a means of monitoring the effectiveness of the process for disseminating safety information within the organization.• Company wide, uncomplicated, reciprocal communications related to safety and quality issues are plainly evident.• All areas, including out-stations and outsource functions, are included in the communication network of the organization.• There is an established means of inter-departmental communication to spread information on SMS related matters.• There exists a formal means of communicating with experts in SMS so that advice can easily and quickly be obtained by personnel. The documentation should indicate where these experts could be located.• All personnel are informed as to who is their primary contact for aviation safety related matters.• There is a process for communication strategy that includes electronic communication, frequent meetings, SMS award systems, employee recognition system, SMS bulletins, etc.• There is a process for sharing safety related information with outside sources that might be impacted by this information.	

Questions

Element	1.4 Communication
Questions	
To accountable executive and functional department heads:	
(A)	What communication processes or methods are in place within your organization? Explain how these processes help your SMS to function effectively?
(B)	How often are SMS meetings held? Who attends these meetings? Do you attend any SMS meetings? How often?
(C)	How does information flow relate to the documentation? How are these made available? (Give examples)
(D)	How is safety information shared within the organization? (horizontally and vertically throughout the organization) How do you know these methods/processes are working?
(D)	How is information on SMS related matters shared between departments? How do you ensure there is company wide, uncomplicated communications?
(BP)	What mechanisms are in place that allow reciprocal communications related to safety and quality issues? (horizontally and vertically throughout the organization)
(BP)	How do you know what the results of these meetings are? How are minutes or decision records kept? How are the results of these meetings communicated to personnel?
(BP)	How are all areas, including out-stations and outsource functions included in the communications network?
(BP)	How are personnel informed as to who is their primary contact for aviation safety related matters?
(BP)	How are best practices identified and shared across the organization?
To employees:	
(A)	How do you know SMS activities are going on within your organization? What evidence do you see that shows SMS is or is not working?
(B)	How often are meetings held? Who attends these meetings? Do you attend any SMS meetings? How often?
(C)	If you needed information related to safety issues, procedures or processes, how would you get it?
(C,D)	How is safety information communicated to you? How do you communicate safety information?
(BP)	Has there ever been a safety related or quality matter that you felt should be brought to the attention of management? How did you deal with this? What response did you receive from management?
(BP)	Who is your primary contact for aviation safety related matters? Do you feel comfortable bringing issues to this person? (explain how, why/why not)

Scoring

Table D1.4 – Safety Management Plan – Communication

Score	Criteria
1	The general exchange of information throughout the organization does not permit the system to function effectively. The organizational communication network does not include all personnel, out-stations and outsource functions.
2	(3) less some aspects
3	<p>A. There are communication processes in place within the organization that permit the safety management system to function effectively.</p> <p>B. Communication processes (written, meetings, electronic, etc.) are commensurate with the size and scope of the organization.</p> <p>C. Information is established and maintained in a suitable medium that provides direction in related documents.</p> <p>D. There is a process for the dissemination of safety information throughout the organization and a means of monitoring the effectiveness of this process.</p>
4	All of (3) plus some aspects of (5)
5	<p>All of 3, plus all of the following:</p> <p>Company wide, uncomplicated, reciprocal communications related to safety and quality issues are plainly evident.</p> <p>All areas, including out-stations and outsource functions, are included in the communication network of the organization.</p> <p>There is an established means of inter-departmental communication to spread information on SMS related matters.</p> <p>There exists a formal means of communicating with experts in SMS so that advice can easily and quickly be obtained by personnel. The documentation should indicate where these experts could be located.</p> <p>All personnel are informed as to who is their primary contact for aviation safety related matters.</p> <p>There is a process for communication strategy that includes electronic communication, frequent meetings, SMS award systems, employee recognition system, SMS bulletins, etc.</p> <p>There is a process for sharing safety related information with outside sources that might be impacted by this information.</p>

Final remarks

There are many detailed questions for the CeO and to a lesser extent Heads of Departments

Because they should lead the SMS

There are virtually no questions for the Safety Manager

Because if he has done his job well then the SMS is in place and understood, so no need to talk to him

There are always few simple “killer” questions for the Staff

Because this means to verify that the SMS has “spread” all the way across the organisation

1.1- Record the survey observations, results and recommendations

CESATK - Survey ExecutionSMS_CAN.1

Survey Details | Survey Answers

Survey Filter

☐ Element MAnagement Review

☐ Tag

Survey structure

Management Review 1-Review Procedure
Management Review 2-SMS adequate and effective
Management Review 3-Corrective actions evaluation
Q1
Has a SMS been established for your organisation?
How do you maintain it?
Q4
Q5
Q6
Q7
Q1 Safety Policy-Employer Expectations
Q2 Safety Policy-Expectation communication
Q3 Safety Policy-Safety obligations role
Q4 Safety Policy-safety philosophy
Q5 Safety Policy
Q6 Safety Policy

Description

What is the process in place for evaluating corrective actions?

Question content as described in Standard

Tag To the accountable executive or safety officer

Answer

☐ 0
☐ 1
☐ 2
☒ 3

Survey Results Area

Comment

Observations Area

Save answer Clear Answer

Record

Observations and
Results
Recommendations

Results and Observations recorded at the survey time or later at the review time for each question

Survey results automatically mapped between sessions

1.2- Record the survey observations, results and recommendations

The screenshot shows the 'Recommendation Management' window. At the top, there are navigation buttons and a status bar indicating '3 of 8'. Below this, the 'Filter Data By:' section includes dropdowns for 'Survey' (SMS_CAN.1), 'Element' (Safety Policy), and a text field for 'Award Score' (2.5). A 'Recommendation' text area contains the text: 'The following action has to be implemented in 30 days'. To the right, a 'Due Date' calendar is set to '18 octobre 2009'. The main part of the window is a table with columns: Survey, Element, Question, Scoring, and Answer.

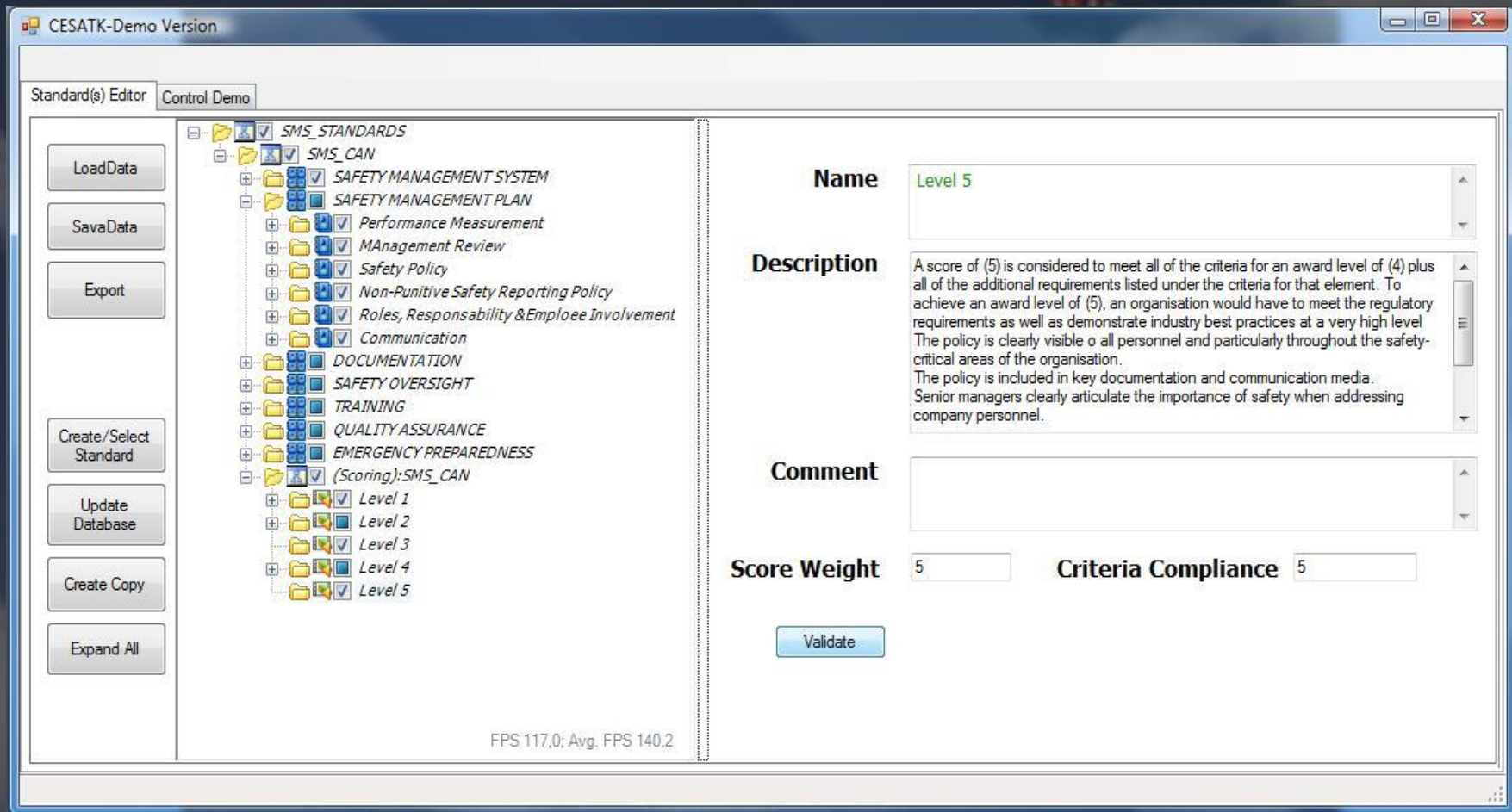
Survey	Element	Question	Scoring	Answer
SMS_CAN.1	Safety Policy	Q1 Safety Policy	3	<input checked="" type="checkbox"/>
SMS_CAN.1	Safety Policy	Q2 Safety Policy	2	<input checked="" type="checkbox"/>
SMS_CAN.1	Safety Policy	Q3 Safety Policy		<input type="checkbox"/>
SMS_CAN.1	SAFETY MANAG...	Has a SMS been estabilis...	2	<input type="checkbox"/>
SMS_CAN.1	SAFETY MANAG...	How do you maintain It?	3	<input type="checkbox"/>
SMS_CAN.1	SAFETY MANAG...	Q1	3	<input type="checkbox"/>
SMS_CAN.1	SAFETY MANAG...	Q4	3	<input type="checkbox"/>
SMS_CAN.1	SAFETY MANAG	Has a SMS been estabilis	2	<input type="checkbox"/>

Observations and
Results
Recommendations

Recommendations recorded later at the evaluation for each Element in a distinct module

Survey questions, results and observations also included to provide consistency with scoring (Award score assignment) and follow-up actions

2.1 Surveyors trained to use the same approach in a consistent manner



Standard Definition: Tree map organisation of Components, Elements, Questions, Criteria, Scoring in a graphical manner

2.2 Surveyors trained to use the same approach in a consistent manner

The screenshot shows the 'CreateSurvey' application window. At the top, there's a toolbar with navigation and action icons. Below it, a 'Select a Base Standard' dropdown menu is set to 'SMS_CAN'. A table lists two base standards: 'SMS_CAN.1' (SEQ 1, CREATION 25.01.2009 22:26, MODIFICATION 14.09.2009 22:26, COMMENT 'The Tr') and 'SMS_CAN.2' (SEQ 2, CREATION 22.03.2009 19:55, MODIFICATION 22.03.2009 19:55, COMMENT). To the right, the 'Survey Description' form is populated with the selected standard's details: Survey NAME: SMS_CAN.1, SEQ: 1, CREATION: 25 ianuarie 2009, MODIFICATION: 14 septembrie 2009, and COMMENTS: The Transport Canada Approach base standard. OK and Cancel buttons are at the top right of the form.

	Survey_NAME	SEQ	CREATION	MODIFICATION	COMM
▶	SMS_CAN.1	1	25.01.2009 22:26	14.09.2009 22:26	The Tr
	SMS_CAN.2	2	22.03.2009 19:55	22.03.2009 19:55	
*					

Survey Description

Survey NAME: SMS_CAN.1

SEQ: 1

CREATION: 25 ianuarie 2009

MODIFICATION: 14 septembrie 2009

COMMENTS: The Transport Canada Approach base standard

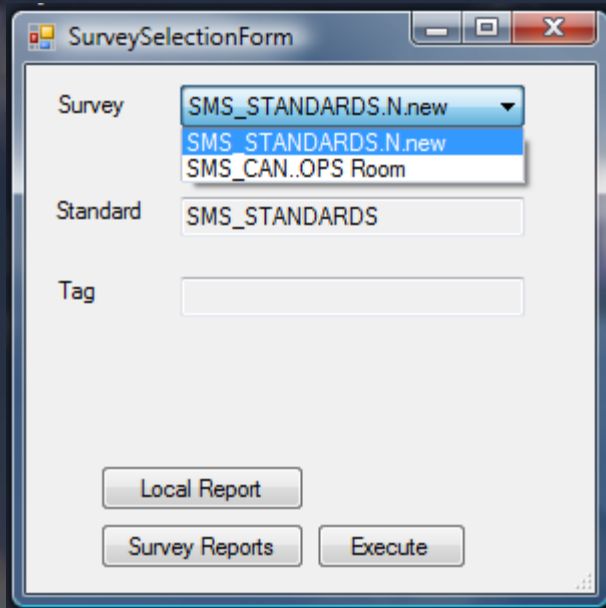
Selection of a base standard to create a **Survey Definition**.

All attributes of the standard are inherited to enable a consistent approach to survey execution

2.3 Surveyors trained to use the same approach in a consistent manner

Standard definition
Survey Definition
Survey Execution Selection

Select Prepared not executed surveys



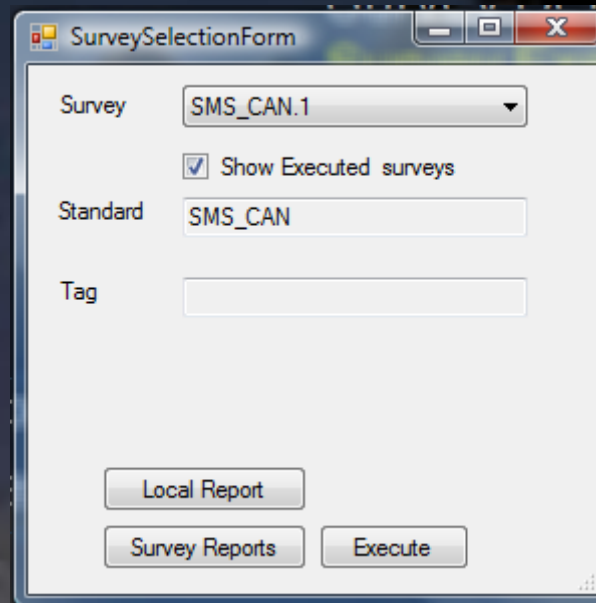
SurveySelectionForm

Survey: SMS_STANDARDS.N.new
SMS_STANDARDS.N.new
SMS_CAN..OPS Room

Standard: SMS_STANDARDS

Tag:

Local Report
Survey Reports
Execute



SurveySelectionForm

Survey: SMS_CAN.1

☒ Show Executed surveys

Standard: SMS_CAN

Tag:

Local Report
Survey Reports
Execute

Review executed surveys

2.4 Surveyors trained to use the same approach in a consistent manner

CESATK - Survey ExecutionSMS_CAN.1

Survey Details | Survey Answers

General

Standard: SMS_CAN

Parent Survey:

Tag:

Surveyed Organization

Name: Organisation Identification

Country: European Union-

Description: ANSP Safety Survey

Tag: OPS Room and ATC Procedures

Surveyer Data

Name: Surveyer A.

Contact: Eurocontrol

Tag: Surveyer Identification

Record

Standard definition
Survey Definition
Survey Execution Selection

Additional data sections to be added for survey identification:

- General Data
- Target Organisation
- Surveyor identification

Multiple attributes for each section, database self recording

2.5 Surveyors trained to use the same approach in a consistent manner

The screenshot shows a software window titled "CESATK - Survey ExecutionSMS_CAN.1". It has two tabs: "Survey Details" and "Survey Answers". The "Survey Answers" tab is active. On the left, under "Survey Filter", there are checkboxes for "Element" and "Tag", with "Element" set to "MAnagement Review". Below this is a "Survey structure" list containing various survey items, including "MAnagement Review 1-Review Procedure", "MAnagement Review 2-SMS adequate and effective", "MAnagement Review 3-Corrective actions evaluation", and several "Q" items related to SMS and safety policy. On the right, the "Description" field contains the question: "What is the process in place for evaluating corrective actions?". Below this, the "Tag" field is set to "To the accountable executive or safety officer". The "Answer" section shows a radio button selection for the value "3". At the bottom right, there is a "Comment" text area and two buttons: "Save answer" and "Clear Answer". A "Record" button is located at the very bottom center of the window.

Survey Execution: Survey questions and all necessary information in a single form

2.6 Surveyors trained to use the same approach in a consistent manner

The screenshot shows the 'Reports' application window. At the top, there is a 'Select a SURVEY' dropdown menu with a list of survey names: ESP.1, ESP.2, NEW_ESP, NEW_ESP.1, NEW_ESP.2, SMS_CAN.1 (highlighted), and SMS_CAN.2. To the left of the dropdown is an 'Open Report' button, and to the right is a 'Run Report' button with a warning icon. Below the dropdown is a large table displaying survey data. The table has columns: Survey, Component, Element, Survey Area/Compliance, Criteria, Question, Survey Answer, Weighting Factor, Criteria Weight, and Standard Criteria Weight. The table is organized into sections for different surveys, with 'ESP.1' and 'SMS_CAN.1' visible. Each section contains rows for various components and elements, with data for survey answers, weighting factors, and criteria weights. The table is paginated, showing '1 of 8' pages.

Survey	Component	Element	Survey Area/Compliance	Criteria	Question	Survey Answer	Weighting Factor	Criteria Weight	Standard Criteria Weight
ESP.1									
BASE STANDARD ESP									
	User Groups								
		ANSP	SA1	SA1	ANSP Question1	3	4		1
					ANSP Question2	3	2		1
					ANSP Question3	5	1		1
					ANSP Question4	5	2		1
					ANSP Question5	5	3		1
				0.80	0.80			1	1
			80.00		0.80	0.80	0.80		1
		SA10	SA10		ANSP Question1	3	3		1
					ANSP Question2	3			1
					ANSP Question3	5			1
					ANSP Question4	5			1
					ANSP Question5	5			1
				0.80	0.80			1	1
			80.00		0.80	0.80	0.80		1
		SA11	SA11		ANSP Question1	3	2		1
					ANSP Question2	3			1
					ANSP Question3	5			1
					ANSP Question4	5			1
					ANSP Question5	5			1
				0.80	0.80			1	1
			80.00		0.80	0.80	0.80		1

Reports: Dynamic tabular off-line reports stored outside database, standard reporting language

2.7 Surveyors trained to use the same approach in a consistent manner

Form1

6 of 7 Find | Next

ReportSurvey

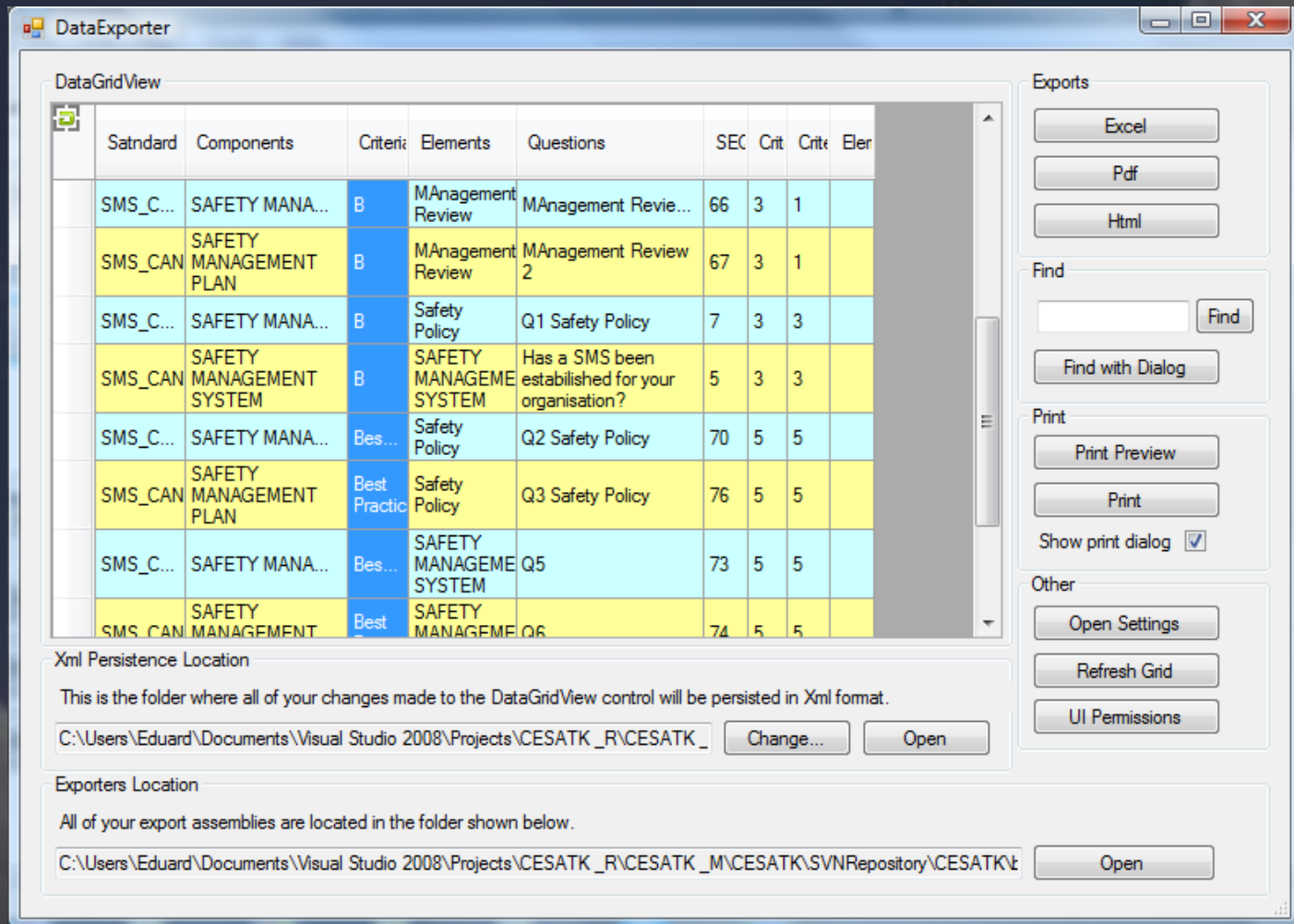
- ESP.1
- ESP.2
- NEW_ESP
- NEW_ESP.1
- NEW_ESP.2
- SMS_CAN.1
- SMS_CAN.2

Survey Name SMS_CAN.1

								SMS_CAN		
									Survey	Criteria Mapping
SAFETY MANAGEMENT PLAN	MANagement Review (5)	4.72	Level 3 (3:3)	2.3	A	MANagement Review 1	0.6666666666666667	2	3	
						B	MANagement Review 1	0.6666666666666667	2	3
							MANagement Review 2	1	3	3
		Level 5 (5:)	5		1	3	5			
		2.25						0.944099378881988	10	14
	Safety Policy (5)	4.31	Level 3 (3:3)	3		1	6	6		
Level 5 (5:)					4.2		0.8333333333333333	5	10	
4.39						0.862938596491228	11	16		
6						0.891039426523297	21	30		
SAFETY MANAGEMENT	SAFETY MANAGEMENT	4.08	Level 3 (3:3)	2.6				0.8666666666666667	13	15

Reports: Web-style predefined dynamic reports stored outside database, standard reporting language, single survey detail

2.8 Surveyors trained to use the same approach in a consistent manner



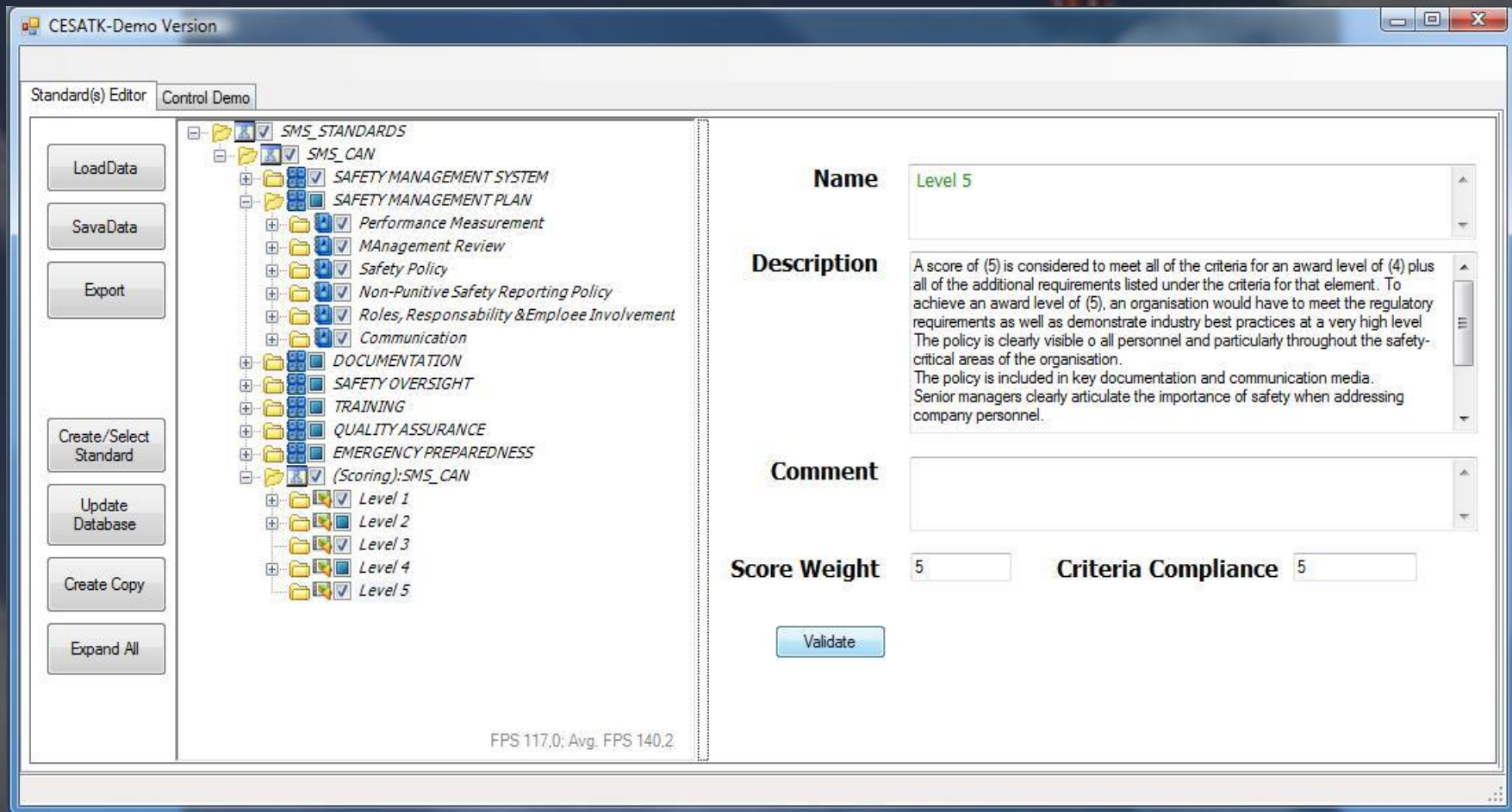
Support functions Preview, Export/Import, Print, with full user customised options

3.1 Define your own survey "standard" based on what you are going to survey : SMS, OPS Room, Equipment , etc

Flexible Standard structure to enable different Survey types and complexity in definition

Component	Node containing other components or children element nodes
Element	Node containing question nodes and a single element scoring node
Question	Node that contains Criteria nodes
Global Scoring	Node that is unique for each standard and contains global criteria
Global criterion	Child node of global scoring and element scoring nodes which are used to compute the score and contain element criteria nodes
Element Scoring	Unique child node of an element node that contains element criteria nodes
Element criterion	Node that appears under the Global Criteria nodes

3.2 Define your own survey "standard" based on different survey structure,



Standard Definition: Graphical mapping of database objects identifying survey structure

4. Present the results so as to identify trends, good practices and less good practices

Multi-survey Reports

Form1

3 of 3

Find | Next

100%

ReportSurveystandard

- ESP
- SAF2010
- SMS_CAN

ne SMS_CAN

										Survey	
SMS_CAN.1	SAFETY MANAGEMENT PLAN	MANagement Review (5)	4.72							0.944099378881988	10
		Safety Policy (5)	4.31	Level 3 (3)	3					1	6
				Level 5 (5)	4.2	Best Practices	Q2 Safety Policy	0.666666666666667	2		
									Q3 Safety Policy	1	3
	8.5									0.891039426523297	21
	SAFETY MANAGEMENT SYSTEM	SAFETY MANAGEMENT SYSTEM (5)	Level 3 (3)	2.6							0.866666666666667
Level 5 (5)			4							0.8	8
4									0.81631419939577	21	
12.5									0.850491803278689	42	
SMS_CAN.2	8.0									0.419047619047619	33

of 3

Reports: Web-style predefined dynamic reports side-by-side surveys based on standard selection for comparison automatic scoring computation

5.1- User requirements to Functional requirements mapping

Essential Requirements

- Flexibility
- User friendliness
- Versatility
- Adaptability
- Performance
- Cost effectiveness
- Portability

Functional Requirements

- Modularity
- Centered around a relational database
- Efficient HMI
- Open interfaces: e.g. XML Interface for easy exchange of data

CESATK Architecture

- **Human Machine Interfaces:** allows a human operator to interact with the business applications layer.
- **Data processing layer:** provides the core functionality, providing HMIs with services and data.
- **Database layer:** provides access through queries to the relational database.
- **Hardware & Operative System:** represents the physical world (not shown on the diagram).

5.2- User requirements to Functional requirements mapping

CESATK Architecture

- Human Machine Interfaces
- Data processing layer
- Database layer
- Hardware & Operative System



CESATK Modules

- HMI Manager

Graphical Components

Standard(s) Template Editor

Survey Template Editor, etc

User Customization Component

User Configuration Files

Action Mapping to graphical components, etc.

- Database mapping module

Data Access Connections

Application Data Mapping

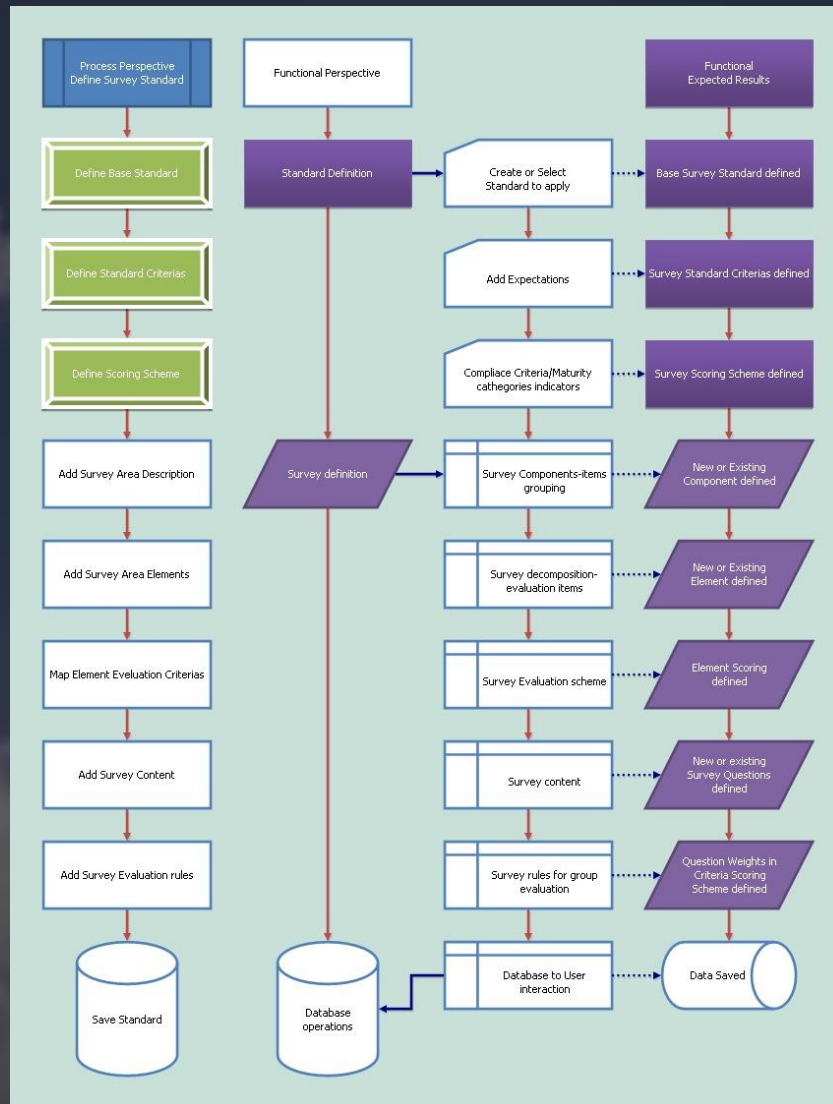
XML Data Mapping

Connectors for graphical components

-Hardware & Operative System

Integrated OS environment (.NET)

5.3- User requirements to Functional requirements mapping



Process Flow

Example: Define Standard Survey

Mapping between:

- Process perspective
- Functional perspective
- Functional decomposition
- Implementation results