PONTE SULLO STRETTO DI MESSINA

PROGETTO DEFINITIVO

EUROLINK S.C.p.A.

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Unità Funzionale	OPERA DI ATTRAVERSAMENTO	PI0005_F0
Tipo di sistema	IMPIANTI TECCNOLOGICI	
Raggruppamento di opere/attività	ESERCIZIO E MANUTENZIONE	
Opera - tratto d'opera - parte d'opera	Management and Control Systems	
Titolo del documento	Electronic Document Management System, Annex	

CODICE	C	G	1	0	0	0	P	W	V	D	P	I	T	M	4	C	3	0	0	0	0	0	0	0	1	F0

REV	DATA	DESCRIZIONE	REDATTO	VERIFICATO	APPROVATO
F0	20/06/2011	EMISSIONE FINALE	HEGJ	JCA	JCA/JCA

NOME DEL FILE: PI0005_F0.docx

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INDICE

Abbreviations

The following Abbreviations are the complete list for all documents under MACS/MMS

Abbreviations for system names:

BMS:	Bridge Management System
CS:	Communication System (internally/externally communication)
CSP:	Computer Simulation and Prediction
EDMS:	Electronical Document Management System
CMS:	Electrical and Mechanical Control
ICMS:	Information & Coordination Management System
MACS:	Management and Control System
MMS:	Management, Maintenance and Simulations
SCADA:	Supervisory Control and Data Acquisition
SHMS	Structural Health Monitoring System
TMS	Traffic Management System
WSMS	Work Site Management System

Other abbreviations:

MO:	Maintenance Office
OCC:	Operation Control Centre
O&M:	Operation and Maintenance
RFI	Rete Ferroviaria Italiana
UML	Unified Modeling Language
OCR	Optical Character Recognition

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1   Executive Summary

1.1   Management and Control Systems, General

The Messina Strait Bridge will span the Messina Strait between Calabria on the Italian mainland and the island of Sicily and will provide the first fixed link between Italy and Sicily. The suspension bridge crossing comprises a 3,300 m main span, which will be longest in the world when constructed. The bridge carries four marked vehicle lanes, two emergency lanes and two rail lines.

The Bridge is to be equipped with a Management and Control System (MACS), which enables the Bridge Operator to carry out the operation of the Bridge and maintenance of the Bridge structure and installations in a safe and structured manner.

MACS is the overall architecture of the whole system. MACS is subdivided into SCADA and MMS. EDMS is a subsystem of the MMS.

> *The EDMS will function as a common document repository and collaboration platform for all users of management and control systems. The users will make use of the EDMS trough the various sub-modules for everyday creation of new documents, updating existing documents and retrieving existing documents. The EDMS will be able to store all document formats used during design, construction and operation - including CAD, photographs and video. All documents in the EDMS will be labelled with tags to facilitate the organisation of documents assist the user in finding the documents and documentation they need.   The EDMS will include workflow functionality to assist collaboration between various users of the subsystems e.g. tracking of changes and approval of intermediate and final revisions of documents   The EDMS will be operational in the design and construction phase - and all relevant data will be transferred from the construction to the operation phase.*

Figure 2.1 below shows the overall system architecture for MACS.

Figure 1.1   Overall system architecture for MACS.
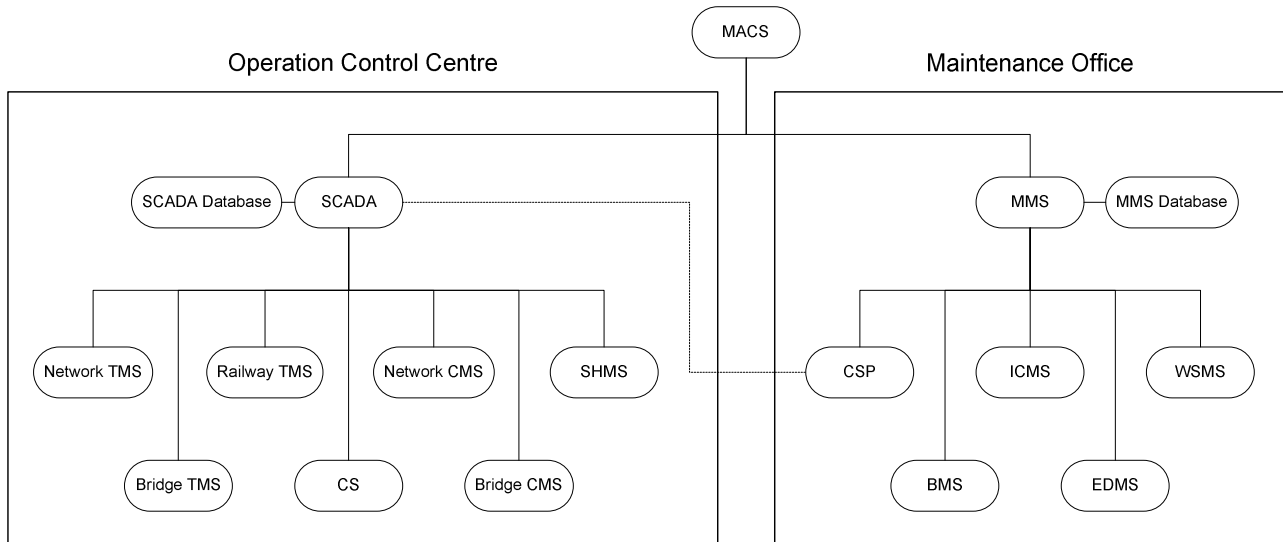
The SCADA system consists of the following Sub-monitoring systems:

- Traffic Management Systems (TMS)

- Electrical and Mechanical Control System (CMS)

- Structural Health Monitoring System (SHMS)

- Communication System (CS)

TMS and CMS are further subdivided into network and bridge Sub-systems.

Figure 1.2 below shows an possible setup of the video wall user interface.

Figure 1.2   A simplified representation of a possible Video wall user interface

Both SCADA operators and MMS operators are allowed to use the large display wall in the bridge Operation Control Center (OCC). In general local data displays on all workstations will have possibility of being presented on the large display wall in the bridge OCC.

The Management, Maintenance & Simulations (MMS) is a portal with interface to SCADA and own Sub-system, where historical data and reports are available. When it comes to handling of daily analysis of data it will be the individual Sub-system under the MSS which will handle this task. The result of this analysis will then be available to the MMS unless otherwise stated.

The Management, Maintenance & Simulations System (MMS) consists of the following Sub-systems:

- Computing of Simulations and Predictions (CSP)

- Worksite Management System (WSMS).

- Bridge Maintenance System (BMS).

- Information and Coordination Management System (ICMS).

- Electronic Document Management System (EDMS)

The MMS system software's will be building upon standard software with the necessary extensions and customizations to achieve the required extra functionalities if possible otherwise it will have to be developed if necessary. The MMS will share the SCADA Man-Machine-Interface in form of a large Display Wall with the SCADA system.

The MMS itself will be a data portal enabling the operator and bridge management to display data from the entire system in forms of plots, tables and standard reports. For this matter the MMS should be able to display data from other system, either data isolated to one system, or data mixed from different systems.

The MMS Sub-system and the data communication are presented in Figure 1.3. All Sub-systems will interact with each other only through the MMS and SCADA databases
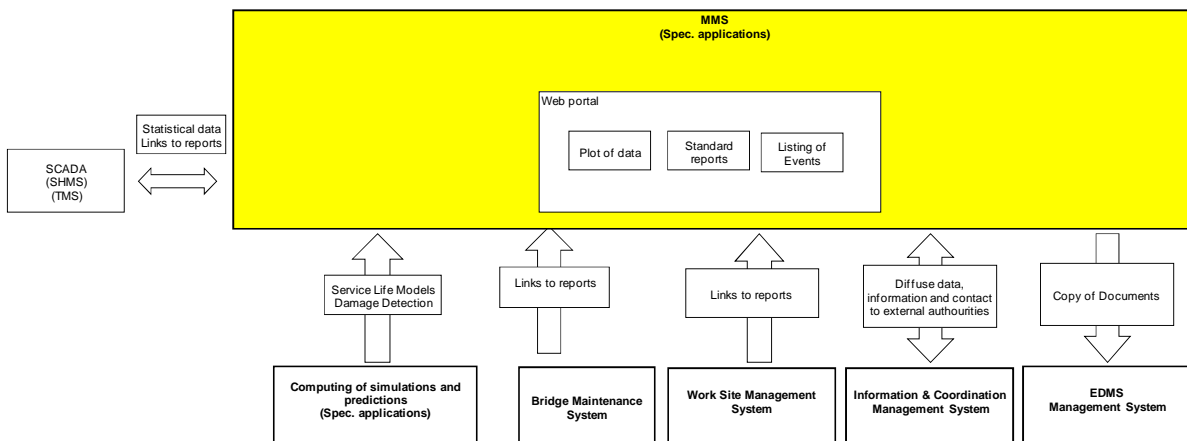
Figure 1.3   The Sub-systems will interact with each other through MMS and SCADA databases

All Sub-systems working under the MMS will be integrated and able to exchange data by means of web services, as well as address and provide display of information on local screens and/or the common large display wall in the OCC.

1.2   The Electronic Document Management System (EDMS)

The Electronic Document Management System (EDMS) is described in this report.

The objectives of this report is to specify general functional requirements for the Electronic Document Management System (EDMS) to be used in the MACS environment in the Operation and Maintenance (O & M) phase.

The document is a design definition plan. It cannot be used as a tender document. It is expected that, during the further detailed design (Progetto Esecutivo) stage, this document will be developed into a Specification.

The report also gives a short description of the IT-technology to be used. The specification of IS infrastructure is located in Component no. 19.

Finally, the report describes the requirements which are needed to be imbedded in the document management systems used in the design and construction stages in order to ensure, that the documents generated in this phase are valid for use in the O & M phase, as controlled by EDMS.

The EDMS will be designed to:

• Function as a secure project collaboration platform for management and control of documents for all Sub-systems. It will be a secure and user-friendly system, which will be accessed and used as a facility by all MACS' Sub-systems. It will facilitate Optical Character Recognition , managing, tracking and protection of all relevant documents including critical information such as approvals, drawings and tenders. The platform will also have a set of procedures for identification, collection, indexing, filing, storing, and will incorporate audit trailing, maintenance and distribution of Documentation/Quality Records.

• The EDMS is a system with a graphical user interface to manage documents. EDMS is also a support system for the other MACS Sub-systems, including an archive in which documents for the other Sub-systems are stored.

• The EDMS can through its own user interface search across the data of other Sub-systems. The EDMS keeps track of the documents through indexing and tagging, making it possible to retrieve related documents and also to set up links to other documents and make references to other documents.

• The EDMS will minimize the risk of breach of sensitive data and in the detailed design of the system. Other security requirements may be necessary to comply with national legislation

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- Any system that transmits files to EDMS must itself ensure the validity of the data to be transmitted, both in terms of content as well as in terms of structure, and include error handling with messages for the user of this other system.

- User rights is controlled centrally for all Sub-systems including EDMS

- The IT technology shall be determined in common for the various technological management systems to be used in the Operation & Maintenance Stage

At completion of the contract, the EDMS will be handed to the Owner.

EDMS will include a service layer, to support the users of the different Sub-systems in MACS, in order to communicate with the document database to:

- Upload documents

- Retrieve documents

- Supersede outdated documents

The EDMS will contain the following functionalities as a minimum:

- Storage in various file format

- Optical Character Recognition

- Registration and tagging

- Indexing

- Workflow and online review

- Subscriber functionality

- Hyperlinking between documents in the EDMS and outside

- Document retrieval

- Audit Trail

- Interface to other MACS Sub-systems

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A document to be controlled by EDMS is expected to contain the following meta data.

1. Language
2. Document title
3. Type of document
4. Related system and application / module (if not covered by document type)
5. Month, year
6. Doc. no.
7. Date of issue
8. Prepared by (organisational unit and persons initials)
9. Checked by - as relevant
10. Approved by – as relevant
11. Responsible organisational unit for future update
12. Element codes/hierarchy for related elements in pull down menus
13. Keywords
14. Sub-system, e.g. module in sub-system

A document controller function shall be established to ensure correct registering, further establishment of metadata and entering of document including related metadata into the "EDMS partition" of the MMS database as needed.

The electronic documents are stored in the EDMS database, more precisely the document partition of the MMS database.

All documents shall have a presentation in electronic format, in a format as selected to be valid. This comprises documents in formats: GIS, CAD, office and other selected formats. Documents can be generated directly in the native formats or they can be generated by scanning or by conversion from other non valid formats.

Certain documents shall also have a presentation in hardcopy, a paper format. These hardcopies shall be generated entirely from the digital file. Such paper documents comprises for instance emergency plans.

EDMS shall include a facility to control and manage documents in hardcopy, documents stored in a paper archive.

Electronic documents which become outdated are moved to remote accessible data stores or otherwise isolated from valid documents. Electronic documents are never deleted in EDMS.

The use of SAP and Aconex is mandatory in the Design and Construction phase. The SAP application will be used by the General Contractor for economy and quantities (incl. all documents

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related to materials) monitoring. Aconex will be used for storage and exchange of design and construction documents prepared during the period.

To identify and keep track of a document each document is assigned a unique code consisting of 26 characters and a limited number of meta data.

Whether the electronic document management system (Aconex) used during the design and construction phase is suitable and will fulfil for the requirements for the operation and maintenance phase, has not yet been clarified.

Either the Aconex or the SAP used during the design and construction period is equipped with an "Inspection and Maintenance Oriented User Interface" during the final stage of the construction period, to be able to operate documents from this phase in the Operation and Maintenance phase or the alternate system is made available for storage of all documents with all metadata required for the Operation and Maintenance.

It is an EDMS activity to establish and attach such metadata for the operation and maintenance phase to all documents stored in the Aconex or SAP during the design and construction stage.

At the beginning of the construction phase all relevant documents will be transferred into the EDMS. The EDMS will include facilities for bulk uploading of documents.

At the end of the construction phase all design documentation and As Built Documents will then accordingly be available in the EDMS to be operated in the operation and maintenance phase.

For safety reasons, safety in management of documentation, it is recommended to keep the Aconex and the SAP document control systems running in the liability period. The related document databases should be the frozen "as built document" databases.

In Figure 1.4 is shown a proposal for establishment of EDMS and for establishment of the document database which shall be operational at the very beginning of the O & M period

Activities for EDMS and for establishment of Database	Before Construction	Construction period							Liability period
		Year 1	Year 2	Year 3	Year 4	Year 5	Year6		Year 1 - 5
Specifications for metatagging of documents	▦								
Procedure for metatagging of Design Documentation and "executivo" documents	▦								
Metatagging of Design Documentation and "executivo" documents		▦	▦	▦	▦	▦	▦		
Conversion of Aconex/SAP document databases to EDMS						▦	▦		
Supplementary, MACS-oriented specifications for EDMS		▦	▦						
Development, implementation, testing, training of EDMS				▦	▦	▦			
Pilot project for use of EDMS							▦		
Extended use of Aconex and SAP, frozen doc databases									▦
Opening of Fixed Link								▮	

Figure 1.4   Time Schedule for Establishment of EDMS and Document Database

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2   Introduction

2.1   Contents

This section gives at small introduction to the bridge and the individual Technological systems which are relevant for the report:

MACS   Management and Control System,

containing the two sub-systems

     SCADA   Supervisory Control and Data Acquisition

     MMS   Management, Maintenance and Simulations

The Electronic Document Management System (EDMS) is a Sub-system to the MMS system.

2.2   The Bridge

The Messina Strait Bridge will span the Messina Strait between Calabria on the Italian mainland and the island of Sicily and will provide the first fixed link between Italy and Sicily. The suspension bridge crossing comprises a 3,300 m main span, which will be longest in the world when constructed.

The bridge carries four marked vehicle lanes, two emergency lanes and two rail lines. The bridge superstructure comprises three separate orthotropic deck steel box girders, one for each of the Sicily and Italy bound roadways and one for the railway. The three box girders are connected by transverse steel box cross girders spaced at 30 m. The superstructure is supported by pairs of hanger cables connected to each cross beam end. The hangers are connected to pairs of main cables on each side of the bridge (four main cables). The main cables are anchored at each bridge end in massive reinforced concrete anchor blocks. The main cables are supported by two steel main towers, each with a height of 399 m above mean sea level. The main towers are founded on reinforced and post-tensioned concrete footings, which are supported on underlying rock formations.

2.3   MACS

The Bridge is to be equipped with a Management and Control System (MACS), which enables the Bridge Operator to carry out the operation of the Bridge and maintenance of the Bridge structure and installations in a safe and structured manner.

MACS is the overall architecture of the whole system. MACS is subdivided into SCADA and MMS.

Figure 2.1 shows the overall system architecture for MACS.
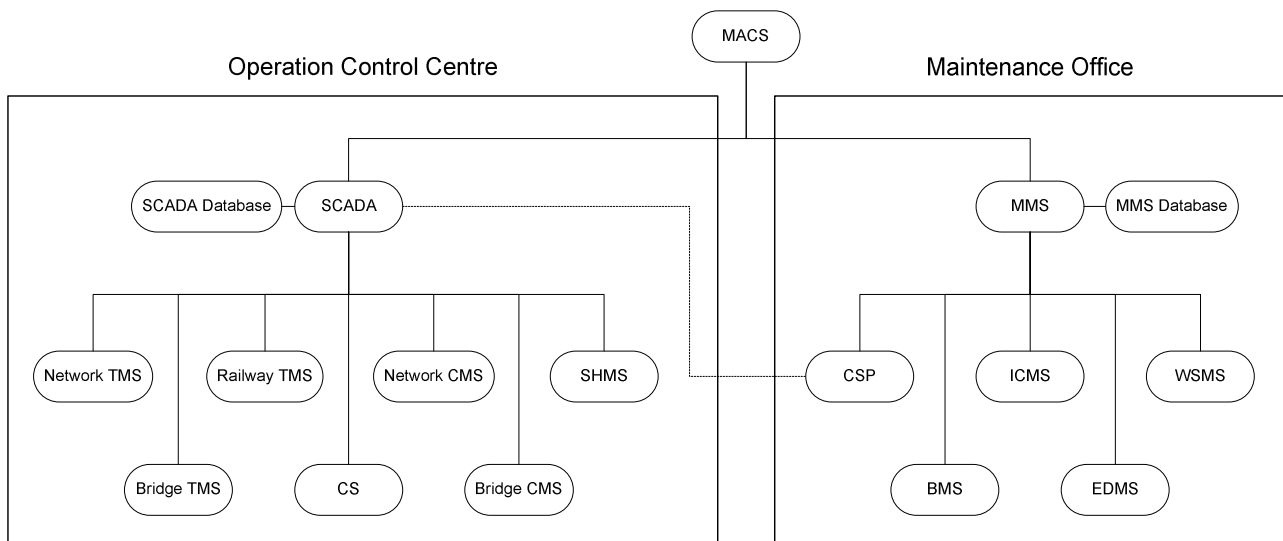
Figure 2.1   Overall system architecture for MACS.

2.3.1   SCADA

The SCADA system consists of the following Sub-monitoring systems:

-    Traffic Management System (TMS)

-    Electrical and Mechanical Control System (CMS)

-    Structural Health Monitoring System (SHMS)

-    Communication System (CS)

TMS and CMS are further subdivided into network and bridge Sub-systems.

The description of the SCADA system is found in Design Specifications Mechanical and Electrical Works, doc. no. CG1001-P-2S-D-P-IT-M4-C3-00-00-00-06-A

Figure 2.1 shows an possible setup of the video wall user interface.
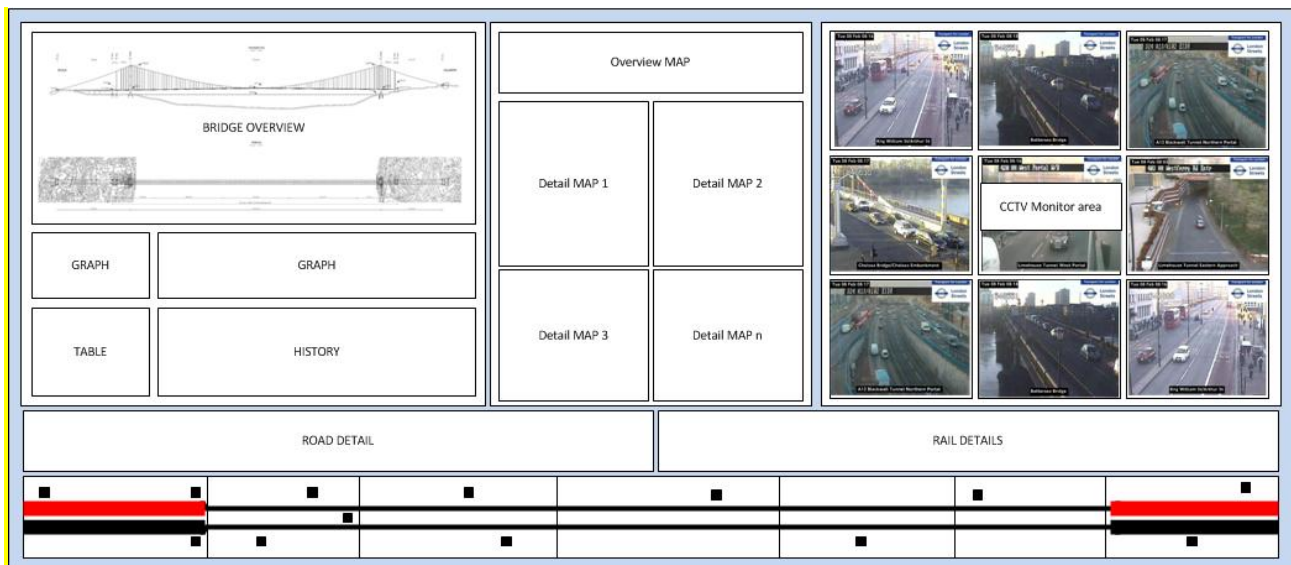
Figure 2.1   A simplified representation of a possible Video wall user interface

Both SCADA operators and MMS operators are allowed to use the large display wall in the bridge Operation Control Center (OCC). In general local data displays on all workstations will have possibility of being presented on the large display wall in the bridge OCC.

2.3.2   MMS

The Management, Maintenance & Simulations system (MMS) is a portal with interface to SCADA and own Sub-system, where historical data and reports are available. When it comes to handling of daily analysis of data it will be the individual Sub-system under the MSS which will handle this task. The result of this analysis will then be available to the MMS unless otherwise stated.

The Management, Maintenance & Simulations System (MMS) consists of the following Sub-systems:

-    Computing of Simulations and Predictions (CSP)

-    Worksite Management System (WSMS).

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- Bridge Maintenance System (BMS).

- Information and Coordination Management System (ICMS).

- Electronic Document Management System (EDMS)

The MMS system software's will be building upon standard software with the necessary extensions and customizations to achieve the required extra functionalities if possible otherwise it will have to be developed if necessary. The MMS will share the SCADA Man-Machine-Interface in form of a large Display Wall with the SCADA system.

The MMS itself will be a data portal enabling the operator and bridge management to display data from the entire system in forms of plots, tables and standard reports. For this matter the MMS should be able to display data from other system, either data isolated to one system, or data mixed from different systems.

The MMS Sub-system and the data communication are presented in Figure 2.2. All Sub-systems will interact with each other only through the MMS and SCADA databases

Figure 2.2   The Sub-systems will interact with each other through MMS and SCADA databases

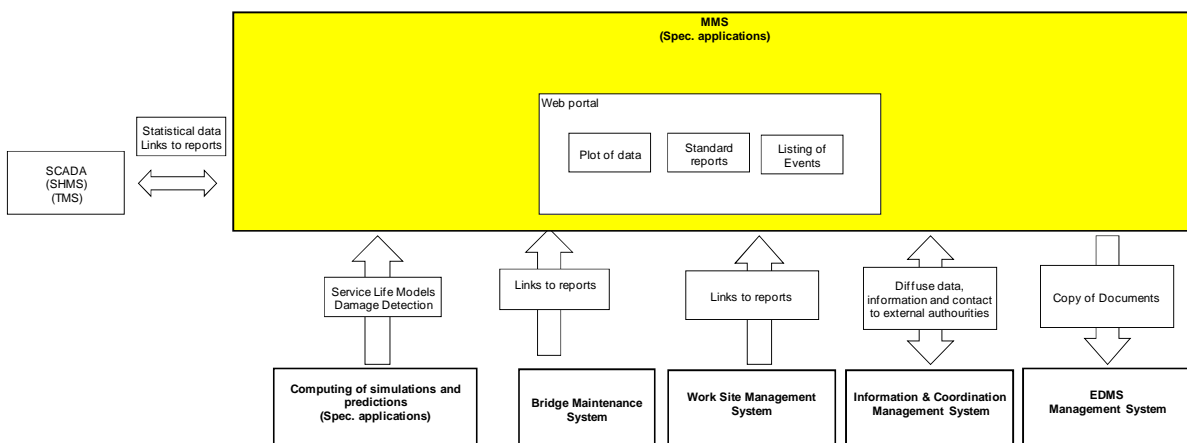All Sub-systems working under the MMS will be integrated and able to exchange data by means of web services, as well as address and provide display of information on local screens and/or the common large display wall in the OCC.

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MMS is described in the Management and Control System, doc. no. CG1000-P-2S-D-P-IT-M4-C3-00-00-00-01-A

The Electronic Document System Management (EDMS) is described in this report.

3 Objective of this report

The objectives of this report is to specify general functional requirements for the Electronic Document Management System (EDMS) to be used in the MACS environment in the Operation and Maintenance (O & M) phase.

The document is a design definition plan. It cannot be used as a tender document. It is expected that, during the further detailed design (Progetto Esecutivo) stage, this document will be developed into a Specification.

The report also gives a short description of the IT-technology to be used.

Finally, the report describes the requirements which are needed to be imbedded in the document management systems used in the design and construction stages in order to ensure, that the documents generated in this phase are valid for use in the O & M phase, as controlled by EDMS.

A suggested program is included as the last section.

4 Requirements to the Electronic Document Management System

4.1 Overall requirements and definition of the EDMS

The EDMS will be designed to:

- Function as a secure project collaboration platform for management and control of documents for all Sub-systems. It will be a secure and user-friendly system, which will be accessed and used as a facility by all MACS' Sub-systems. It will facilitate Optical Character Recognition , managing, tracking and protection of all relevant documents including critical information such as approvals, drawings and tenders. The platform will also have a set of procedures for identification, collection, indexing, filing, storing, and will incorporate audit trailing, maintenance and distribution of Documentation/Quality Records.

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- The EDMS is in itself a system with a graphical user interface to manage documents. EDMS is also a support system for the other MACS Sub-systems, including an archive in which documents for the other Sub-systems are stored.

- The EDMS can through its own user interface search across the data of other Sub-systems. The EDMS keeps track of the documents through indexing and tagging, making it possible to retrieve related documents and also to set up links to other documents and make references to other documents.

- The EDMS will minimize the risk of breach of sensitive data and in the detailed design of the system. Other security requirements may be necessary to comply with national legislation

- Any system that transmits files to EDMS must itself ensure the validity of the data to be transmitted, both in terms of content as well as in terms of structure, and include error handling with messages for the user of this other system.

- User rights is controlled centrally for all Sub-systems including EDMS

- The IT technology shall be determined in common for the various technological management systems to be used in the Operation & Maintenance Stage

At completion of the contract, the EDMS will be handed to the Owner.

The specification of IS infrastructure is located in Component no. 19.

4.2   Exchange of documents

EDMS will be the central electronic document management system. All document exchange between the various MACS Sub-systems will be controlled by EDMS.

All documents generated in the different Sub-system is stored in the EDMS. The EDMS will optimize the access to the documents of the Sub-systems leading to faster and easier access to these documents and thus lowering operating costs. These benefits can only be netted by having a system that handles all documents in one system.

EDMS will include a service layer, to support the users of the different Sub-systems in MACS, in order to communicate with the document database to:

- Upload documents

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- Search and Retrieve documents

- Supersede outdated documents

- Change meta data

- Delete

- Edit

- Etc.

The service layer is an Application Programming Interface, API, which facilitates the data exchange between the various Sub-systems.

The exchange of documents between the various Sub-systems is shown on Figure 4.1.
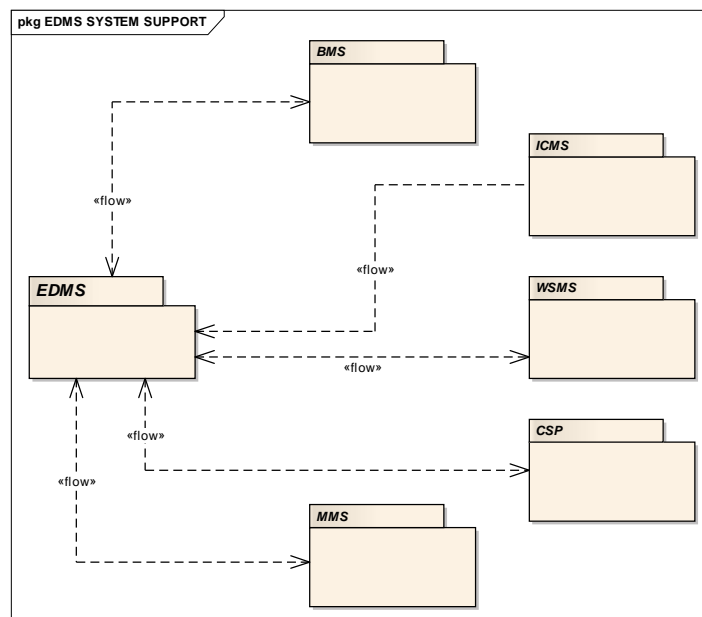
Figure 4.1   Exchange of documents between Sub-systems.

4.3   Major Functionalities

The EDMS will contain the following functionalities as a minimum:

•   Storage in various file formats

•   Optical Character Recognition

•   Registration and tagging

•   Indexing

•   Workflow and online review

•   Subscriber functionality

•   Hyperlinking internally between documents in the EDMS and externally

•   Document retrieval

•   Audit Trail

•   Interface to other MACS Sub-systems

•   Bulk uploading of documents

4.4   Description of functionalities

4.4.1   Storage, Files and Formats

All relevant documents from the design and construction phase and all documents generated in the different Sub-systems during Operation and maintenance are stored in the EDMS database, actually the EDMS controlled partition of the MMS database.

Documents are in EDMS context defined as electronic files in multimedia formats. These files can be CAD drawings as well as Office documents in native format, PDF-files, digital photographs, video, but also scanned paper-based documents. All such documents will form the content of the EDMS.

4.4.2 Optical Character Recognition (OCR)

The OCR facility shall ensure retrieval of scanned documents, see figure 4.2.

4.4.3 Registration and tagging with metadata

The registration and tagging functionally assists the user in registering a new document, including assignment of unique identifier code and other metadata.

When a Sub-system processes data and generates a document, the document is sent to the EDMS together with metadata, including registration data. The document will then be available to other systems if relevant. Standard reports will contain some predefined metadata, such as type of document and Sub-system. Registration of documents can as well be directly in the EDMS for documents not generated by one of the sub-systems.

Each document is identified with a unique code. The coding system will be relevant to all Sub-systems and adequate for all documents generated in the operation and maintenance phase. The coding system is based on, but not necessarily identical to the document coding system used in the design and construction phase, consisting of 26 characters.

In addition all documents are registered with exhaustive and relevant metadata for easy future retrieval. Pulldown menus are used when ever efficient and possible to ensure correct tagging.

Metadata must comply with an international standard like ISO 15836 (The Dublin Core metadata element set).

This standard shall be customized and reconfigured as necessary to support the Stretto di Messina needs

A document to be controlled by EDMS is expected to contain the following meta data.

1. Language
2. Document title
3. Type of document
4. Related system and application / module (if not covered by document type)
5. Month, year
6. Doc. no.
7. Date of issue
8. Prepared by (organisational unit and persons initials)
9. Checked by - as relevant
10. Approved by – as relevant

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11. Responsible organisational unit for future update
12. Element codes/hierarchy for related elements in pull down menus
13. Keywords
14. Sub-system, e.g. module in sub-system

A document controller function shall be established to ensure correct registering, further establishment of metadata and entering of document including related metadata into the "EDMS partition" of the MMS database as needed.

4.4.4 Indexing

In general the metadata will give adequate and to a certain extent sufficient identification for easy retrieval. The indexing is an option to assist fast access from the user or from other Sub-systems in special situations. The indexing facility is standard for electronis document management systems. For instance it provides the user with a general facility to retrieve all documents which includes a certain word or entity.

4.4.5 Workflow and review

The workflow functionality defines workflows that can be assigned to documents. A workflow will place a document on a well defined route through the organization, typically with the aim of completing and eventually approving the document and finally archiving the document.

It will be possible to assign a workflow to a folder in EDMS. When a workflow is assigned to a folder, all documents at the root of the folder will inherit the folder's workflow and will automatically be placed in the first state defined for that workflow.

It will not be possible to have more than one workflow active in any folder at the same time. The workflows will provide the facility to e-mail notifications to designated users, after an action has been taken.

The EDMS include version control and other security features to support this as well as more simple administrative tools.

Online viewer is available to mark-up and save changes to documents during a review process in a workflow step

4.4.6   Subscriber functionality

EDMS shall support a subscriber facility. Users shall be able to subscribe to new or revised documents as prepared or revised:

- By dedicated persons

- Related to dedicated elements

- Containing dedicated keywords (indexes)

4.4.7   Hyper linking

To assist the document reader in accessing related documents hyperlinks inside documents must be supported. It is a requirement that there is an interface, which can capture all hyperlink/-URL calls from a document, and query the database to locate the linked document. Links must always point to the current approved version of a document

4.4.8   Retrievel and Publishing of Documents

Easy retrieval of stored documents is ensured through the use of advanced search capabilities built on Meta tagging primarily and indexing as relevant.

The EDMS will support the following functionality from its own as well as from other MACS systems user interface:

- Browse and search for documents and information

- Check in and check out documents

- Supersede and update documents

- View a document's version history

- Approve documents for publishing

- Publish documents for viewing by a larger community of users.

Access to EDMS is controlled by MACS.

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4.4.9   Audit Trail

EDMS will in a log-file register all transactions related to the electronic document database. As a minimum: user id, Sub-system id, document id, time and in/out.

Information on transaction for each document will be easily available from the document

4.4.10   Interface to EDMS

Interface to documents stored in the EDMS will be trough other subsystems - see the following section - or though its own interface though a portal with a graphical interface designed specifically for the EDMS. The Portal and the documents within the EDMS may be accessed by anyone having the appropriate user rights for the specific documents.

4.4.11   Interface to other MACS Sub-systems

The EDMS is defined so that seamless access from the other MACS Sub-systems can be achieved.

EDMS will use the common enterprise service bus for all subsystems, to support the users of the different Sub-systems in MACS, in order to communicate with the document database:

Exchange of electronic data with the other Sub-systems must comply with an international standard for example like ISO 14721:2003 (Space data and information transfer systems - Open archival information system - Reference model) These must be customized and reconfigured so they can best support the Stretto di Messina needs.

4.4.12   Not included in EDMS

The EDMS does not include a journal system for the handling and registration of mail, neither printed nor electronic mail.

4.5   The Document Database

The electronic documents are stored in the EDMS database, more precisely the document partition of the MMS database.

All documents shall have a presentation in electronic format, in a format as selected to be valid. This comprises documents in formats: GIS, CAD, office and other selected formats. Documents can be generated directly in the native formats or they can be generated by scanning or by conversion from other non valid formats.

Certain documents shall also have a presentation in hardcopy, a paper format. These hardcopies shall be entirely generated from the digital file. Such paper documents comprises for instance emergency plans.

EDMS shall include a facility to control and manage documents in hardcopy, documents stored in a paper archive.

Electronic documents which become outdated are moved to remote accessible data stores or otherwise isolated from valid documents. Electronic documents are never deleted in EDMS.

Figure 4.2 shows a schematic presentation of the generation of documents in digital format and in hardcopy, when requested.
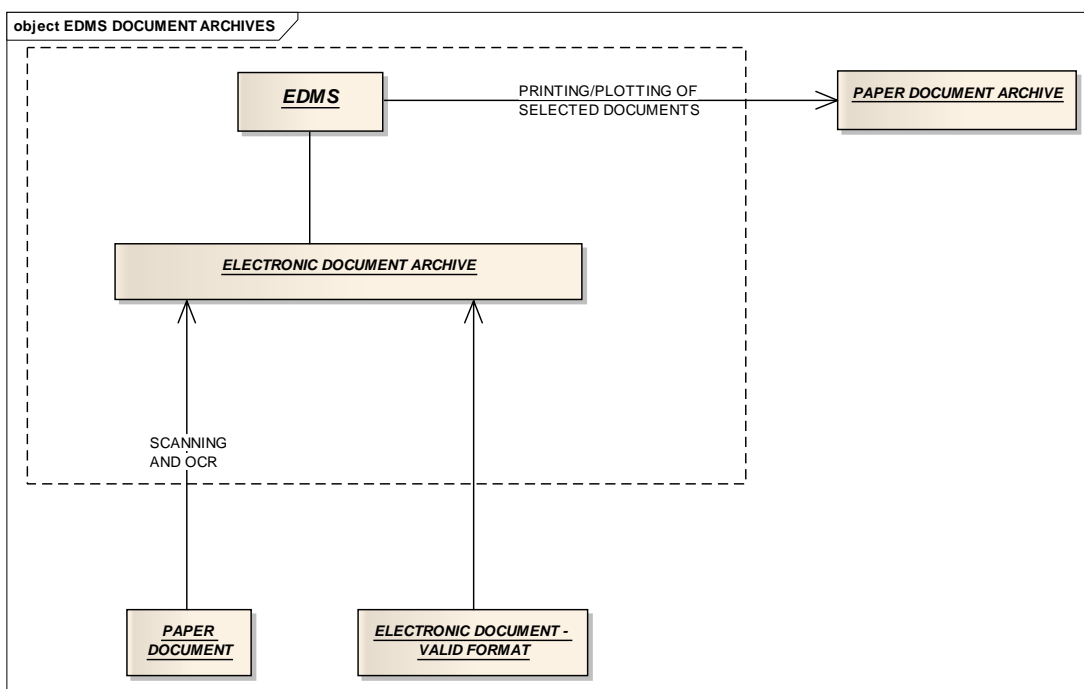

Figure 4.2   Establishment of Document Archives

5   Document Management in the Design and Construction Phases

The use of SAP and Aconex is mandatory in the Design and Construction phase. The SAP application will be used by the General Contractor for economy and quantities (incl. all documents related to materials) monitoring. Aconex will be used for storage and exchange of design and construction documents prepared during the period.

To identify and keep track of a document each document is assigned a unique code consisting of 26 characters and a limited number of meta data.

Whether the electronic document management system (Aconex) used during the design and construction phase is suitable and will fulfil for the requirements for the operation and maintenance phase, has not yet been clarified.

Either the Aconex or the SAP used during the design and construction period is equipped with an "Inspection and Maintenance Oriented User Interface" during the final stage of the construction period, to be able to operate documents from this phase in the Operation and Maintenance phase or the alternate system is made available for storage of all documents with all metadata required for the Operation and Maintenance.

It is an EDMS activity to establish and attach such metadata for the operation and maintenance phase to all documents stored in the Aconex or SAP during the design and construction stage.

At the end of the construction phase all design documentation and As Built Documents will then accordingly be available in the EDMS to be operated in the operation and maintenance phase.

For safety reasons, safety in management of documentation, it is recommended to keep the Aconex and the SAP document control systems running in the liability period. The related document databases should be the frozen "as built document" databases.

6   Time Schedule for EDMS

In Figure 6.1 is shown a proposal for establishment of EDMS and for establishment of the document database which shall be operational at the very beginning of the O & M period.

Activities for EDMS and for establishment of Database	Before Construction	Construction period						Liability period
		Year 1	Year 2	Year 3	Year 4	Year 5	Year6	Year 1 - 5
Specifications for metatagging of documents	▉							
Procedure for metatagging of Design Documentation and "executivo" documents	▉							
Metatagging of Design Documentation and "executivo" documents		▉	▉	▉	▉	▉	▉	
Conversion of Aconex/SAP document databases to EDMS						▉	▉	
Supplementary, MACS-oriented specifications for EDMS		▉	▉					
Development, implementation, testing, training of EDMS				▉	▉			
Pilot project for use of EDMS						▉		
Extended use of Aconex and SAP, frozen doc databases								▉
Opening of Fixed Link							▉	

Figure 6.1   Time Schedule for Establishment of EDMS and Document Database

7   List of requirements

The following is a list of requirements gathered through:

• The technical specification from Stretto di Messina

• The Contractors tender design

• Meetings with EUROLINK

• Meeting with designers of other subsystems

• Inferred from the design process itself

The functional requirements described in the section 4.4 above must be considered too.

ID	Requirement	Requirement Reference
1.	The General Contractor must produce, maintain and distribute documentation produced for the Project according to the procedures.	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.
2.	The General Contractor provides the documents and data which the Client retains necessary to acquire for the computer science support. To produce the documentation the following or similar programs with compatible characteristics are recommended: • Microsoft Windows 2000 • Microsoft Windows XP (Operating System server) Professional version • Microsoft Word for Windows • Microsoft Excel Windows • Microsoft access for Windows • Microsoft PowerPoint for Windows • Adobe Acrobat • Microsoft formed JPEG • Microsoft formed Geo-referential format Geo TIFF • Formed video MPEG-4 • Compressed archives ZIP, tar + gzip	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.
3.	The General Contractor must maintain a system of electronic management (EDMS) for all the documentation sent out during the phases of the project and the execution of the Bridge. This shall facilitate the exchange of the documentation, the monitoring of the	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.

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	configuration (see norm UNI 10007: quality Management – Guide to management of configuration) and, at the completion of the Project, the documentation in electronic version is assigned to the Client. The hardware and software architecture of the EDMS system must be based on standard products, commercially available. The EDMS system shall be reached through a portal made specifically for the Project, with the appropriate monitoring of the admissions and the roles.	
4.	The General Contractor shall import the following documents into the EDMS system: • documents and drawings for planning of the Bridge • documents and plans for Programming, Monitoring and the Progress of the Works of the Project • documents and drawings produced by the Managers of the works • documents and drawings produced by Third party Contractors, Sub-contractors and Suppliers • documents of monitoring of quality and of the traceability of the components • correspondence and transmittal of the Project • images and photos relating to the Project • documents and data concerning the environmental monitoring • documents and data concerning Health and Safety	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.

5.	The EDMS system shall allow as a minimum the following functionality: • control of access • control of roles • management of electronic files • prints of documents • check in and check out of documents • management of the revision/versions of the documents • electronic distribution of documentation • registration of the transmittal in electronic format • reporting	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.
6.	The General Contractor shall also submit the following for approval: • the Document Breakdown Structure (DBS) of the data bank of documents • the Document Info Record (DIR) describing the documents.	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.
7.	The frequency and the mass of information to be exchanged during the execution of the Project requires the use of a transmission network of data which is reliable and efficient and which allows a connection between the involved entities. First of all they are identified as those who are involved in the exchange of data and the documents pertaining to the Project: • The Client (office, personnel in the offices of third parties, yards) • The General Contractor (offices and yards) • The Administration of the Works (offices and yards)	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.

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8.	The information and the services to be supplied which are important for the data flow to the Client, non-exhaustive: • information regarding the progress of the works and the total balance • communications concerning the development relating to the management of the Project (test assignments, various notifications) • technical documentation (drawings and documents, etc.) • data regarding environmental monitoring • data regarding design changes or changes of the work plan • approvals or certifications and fulfillment of the economic correlatives • planning of the works, supply of materials, etc • documents and data of quality control • data relating to the traceability of components and the associated documents • electronic mail • transmission of images and documents, etc	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.
9.	The General Contractor must create and operate a portal with monitored access for the development of the Project, as an example, for the communication with the portal of the Client, for the management of the documentation, for the access to the FTP server, for the access to a discussion forum, etc.	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.

10.	The General Contractor must install and create a FTP server for the safety of the large electronic files which are generated for the Project. The configuration and the organization of the server must explicitly be approved by the Client and the entitled users defined according to the procedures defined in advance.	Messina Strait Bridge tender Design, MANAGEMENT OF THE PROJECT, Management of Informatic Data and Documents, GCG.E.01.08, Stretto di Messina, 30 September 2004.