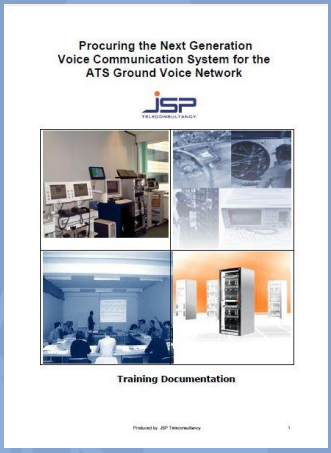
Course code: JSP-EU300

John Palmer has been a communications consultant to EUROCONTROL in Brussels for more than 6 years followed by 10 years with a role of external consultant. He also has over 15 years of experience in the private telecoms industry working for a number of large and medium sized telecoms companies in the UK, Italy and Belgium.

John Palmer has over 12 years of experience of delivering Voice Communication courses to Air Navigation Service Providers, Civil Aviation Authorities and Private companies in Europe, North America, the Middle East, China, Indonesia, Australia and New Zealand.



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Procuring the Next Generation Voice Communication System for an ATS Network

Course Background

With the rapid changes in technology, there are many considerations to be taken into account when procuring a new Voice Communication System (VCS) and associated equipment today for a Tower, Approach or Area Control Centre. The next generation VCS not only has to have capability of handling all Telephone call types, Aeronautical Radio communications and Recorder sessions while connected to a converged multimedia IP network infrastructure through the Next Generation VoIP Telephone/Radio/Recorder interfaces, but it also has to interface with the Operator Positions and the Control and Monitoring System. The VCS should also have the capability of handling Role Management within or between control centres and this requires that system interoperability using common standardized protocols with other vendor systems located within Functional Airspace Block is possible which leads to a smooth management of dynamic re-allocation of airspace sectors within those blocks.

This 3 day course has the scope of providing guidance to system engineers/technical staff involved in defining both the Operational and Engineering technical requirement specifications for the Next Generation VCS and associated equipment. It is a generic course, kicking-off with a high-level overview of the procurement process and methodology before analysing the system requirements of the elements forming the Next Generation VCS system.

The courses comprises of the following 16 modules:.

- VCS Procurement Process
- Architectural
- Radio/Telephone Systems
- System Engineering
- Voice Quality
- Recording
- VCS Control and Monitoring System
- Test and Development VCS System
- Training VCS System
- CWP-HMI Operational
- Safety/Security
- Environmental Conditions
- Supplier Support Services
- Quality and Qualification

The course defines Next generation VCS requirements for operational features and functionality identified as a result of requirement captures from operational staff, extended progression on previously published EUROCONTROL VCS procurement guideline documents, the foreseen implementation of Functional Airspace Block operation within Europe by a number of FAB design groups, System interoperability and functionality as defined by EUROCAE WG67 documents as well as Future Planning documents and policy from the NEXTGEN and SESAR programs.

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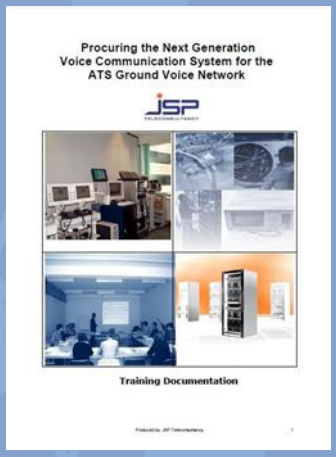
www.jsp-teleconsultancy.com.

JSP-Teleconsultancy Via Gorizia, 11 Folignano 63084 Ascoli Piceno Italy

Course code: JSP-EU300

Course duration:
6 hours per day with 10 or 20 minute breaks every hour as defined below:

HOUR 1	09.00 - 10.00
BREAK	10.00 - 10.20
HOUR 2	10.20 - 11.20
BREAK	11.20 - 11.30
HOUR 3	11.30 - 12.30
LUNCH	12.30 - 13.30
HOUR 4	13.30 - 14.30
BREAK	14.30 - 14.40
HOUR 5	14.40 - 15.40
BREAK	15.40 - 16.00
HOUR 6	16.00 - 17.00



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Course Description

Detailed outline of 3 day course

A typical day starts at 09h00 and finishes at 17h00.

1	VCS PROCUREMENT PROCESS	2	ARCHITECTURAL	3	RADIO SYSTEM	4	TELEPHONE SYSTEM
	180 minutes		90 minutes		90 minutes		90 minutes
5	SYSTEM ENGINEERING	6	VOICE QUALITY	7	RECORDING	8	VCS CONTROL & MONITORING SYSTEM
	90 minutes		30 minutes		60 minutes		90 minutes
9	TEST AND DEVELOPMENT VCS SYSTEM	10	TRAINING VCS SYSTEM	11	CWP-HMI OPERATIONAL	12	SAFETY
	15 minutes		15 minutes		120 minutes		30 minutes
13	SECURITY	14	ENVIRONMENTAL CONDITIONS	15	SUPPLIER SUPPORT SERVICES	16	QUALITY ASSURANCE AND QUALIFICATION
	30 minutes		30 minutes		60 minutes		30 minutes

Benefits for course participants

After completing the course, participants will have acquired a deeper understanding of facilities required today on Next Generation VCS systems, Aeronautical Radios, Voice Recorders, Monitoring and Control Systems and the considerations to be made when defining VCS procurement specifications, in particular:

Course suitable for

Professionals within various sectors of the aeronautical industry who need to develop a greater understanding of the Next Generation VCS capabilities.

Course Pre-requisites

It is assumed that a course attendee has a telecommunications background.

Course code: JSP-EU300

JSP TELECONSULTANCY

Course duration:
6 hours per day with 10 or 20 minute breaks every hour as defined below:

HOUR 1	09.00 - 10.00
BREAK	10.00 - 10.20
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BREAK	11.20 - 11.30
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LUNCH	12.30 - 13.30
HOUR 4	13.30 - 14.30
BREAK	14.30 - 14.40
HOUR 5	14.40 - 15.40
BREAK	15.40 - 16.00
HOUR 6	16.00 - 17.00

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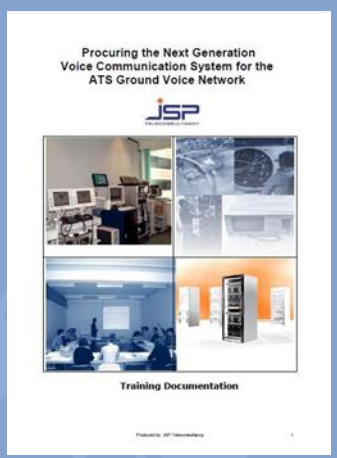
The course language is English. Course participants supplied with Course book and CD containing a full set of slides and notes to accompany each slide.



Contact us for more details or to arrange a course suitable for you at a location chosen by you

Detailed outline DAY 1

A typical day starts at 09h00 and finishes at 17h00.

1	VCS PROCUREMENT PROCESS	2	ARCHITECTURAL	3	RADIO SYSTEM
	180 minutes		90 minutes		90 minutes

Module 1: VCS PROCEUREMENT PROCESS

- Course Introduction/Overview
- Procurement Terminology
- Procurement Types
- Key approval stages
- Project Lifecycle
- Project Approval
- The Invitation To Tender (ITT) process
- Invitation To Tender Stages
- Key ITT Process Issues
- Call for Expression of Interest
- Pre-Qualification
- Quality Assurance Review
- Systems Requirements Capture Methodology
- VCS Procurement Specifications
- Citing of Reference Documents/Standards
- Terminology for Requirements, Recommendations and Options- Paragraph Classification
- Requirement examples
- Structure of Specifications and high level content
- Invitation to Tender-Issues
- Tender Response Time
- Standard Terms and Conditions
- Confidentiality Agreements
- Response Documents
- Compliance Matrix
- Tenderer Clarification Process
- Received Offers Protocol
- Technical Tender Evaluation Criteria/Report
- Detailed Evaluation- Clarification requests to Tenderers
- The Technical Result
- Commercial Evaluation Process
- Price/Budget/Best Value/Costed Options
- Payment Schedules/Warranties/Penalties
- Contractual Documents
- Approval and Launch/Contract Award Notice
- Unsuccessful Tenderers Debriefing
- Dispute Process-Litigation
- Project Kick-Off meeting
- Project Management Plan
- Project Definition Document
- Risk Management
- Milestones/ Deliverables
- Interface Control Documents (ICDs)
- Testing Strategy/FAT/Installation and SAT.
- Engineering and ATCO Training
- Pre-operational Evaluation Period
- Operational Handover

Module 2: ARCHITECTURAL REQUIREMENTS

- Reference Architectural design
- Main/Back/Fallback/Last Resort systems
- Normal/Degraded Operation
- Software and Hardware Diversity Requirements
- On-line/Test & Development/ Training VCSs
- VCS Control and Monitoring System (VMCS)
- Controller Working Positions (CWPs)
- CWP, Radio, Telephone Connectivity
- System Modularity/Expandability/Redundancy
- Availability, Reliability, Maintainability (ARM)
- Non-Blocking/ Maximum Resource Usage
- Single Points of Failure/ System Component Independence
- Autonomous Operation/ Continuity of operations
- Radio resource sharing architecture
- Integration of Radio and Telephone functionalities
- Initial/Operating/Maximum Capacity
- CWP/Telephone/Radio/Legal Recording Capacity
- Network performance times precautions

Module 3: RADIO SYSTEM TECHNICAL REQUIREMENTS

- Frequency Object Definition
- Radio Access Modes of Operation and Control
- Frequency Control
- Manual Control of Tx and Rx Channel Groups and Channels
- Best Signal Selection (Rx Voting)
- Stepped-on transmission detection
- Mute Tx Feedback from Loudspeaker
- Transmission (PTT) and Transmission Override
- PTT Identity Notification
- Side Tone
- Acoustic Feedback (Larsen effect) Protection
- PTT & A/C Call Locked-on Condition Prevention
- Distortion/Echo prevention with simultaneous reception on different frequencies
- Cross-coupling (Retransmission)
- Multi-Carrier Offset Transmission Operation
- Multi-sites using single frequency
- Radio Equipment Monitoring and Control
- Emergency Frequency management
- Alarms and Automatic Checks
- Radio Interface Requirements
- Unmanned Aircraft System (UAS) Functions
- PTT Activation Signal to Radio Transmission Direction Finder
- Radio Communication Performance Requirements

Summary of first day- Questions and Answers session

Course code: JSP-EU300

Course duration:
6 hours per day with 10 or 20 minute breaks every hour as defined below:

HOUR 1	09.00 - 10.00
BREAK	10.00 - 10.20
HOUR 2	10.20 - 11.20
BREAK	11.20 - 11.30
HOUR 3	11.30 - 12.30
LUNCH	12.30 - 13.30
HOUR 4	13.30 - 14.30
BREAK	14.30 - 14.40
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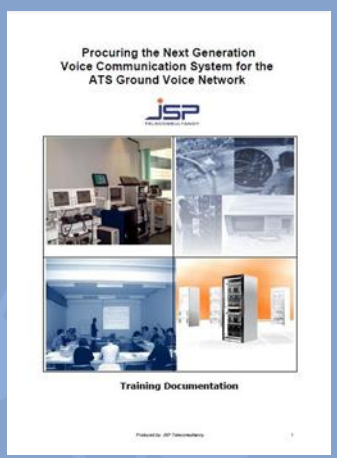

Contact us for more details or to arrange a course suitable for you at a location chosen by you

Detailed outline DAY 2

A typical day starts at 09h00 and finishes at 17h00.

4	TELEPHONE SYSTEM	5	SYSTEM ENGINEERING	6	VOICE QUALITY	7	RECORDING	8	VCS CONTROL & MONITORING SYSTEM
	90 minutes		90 minutes		30 minutes		60 minutes		90 minutes

Module 4: TELEPHONE SYSTEM TECHNICAL REQUIREMENTS

- Description of Call types (DA/IDA/IA/Priority DA/OVR etc.) and their operation (initiated/terminate procedures)
- Call Queuing facility
- System Design requirements wrt telephony
- Dynamic Display functionality-Split/Combined
- DA/IA key pages + Keys per page
- Telephone Directory
- Adjustable settings for Incoming/Outgoing Calls
- Last Resort Call feature
- Inter-VCS features – Intrusion/Conference/Call Transfer/
- Internal -CS features- Common Appearance, Broadcast, Hold, Pick-Up, Forwarding, Hunt Group, Group Call, Redial etc.
- Positioning Monitoring
- Simultaneous Calls
- Addressing and Numbering Schemes
- External connections and Protocols
- Interworking with ATS legacy systems-Gateway interfaces
- Connectivity with Private and Public Telephone Networks
- Incoming call barring and restriction
- Handling of outgoing calls/routing criteria
- Line Characteristics
- Short Term Recording
- Telephone Communication Performance Parameter

Module 5: SYSTEM ENGINEERING

- Management Provision Levels – Element/Network/Service/User
- Management System & Service on VCS/Radio/ Recorder interfaces
- ED-136 System Requirements
  - Redundancy
  - Statistics / General/Incoming/Outgoing calls
  - Maximum number of CWPs
  - Operational use of system functionalities
  - System Circuit Check
  - Detection of End-to-End Connection Loss
  - Transit
  - Classes of Service
  - VCS on-line reconfiguration
  - Audio-mixing capabilities
  - Loss of Power
- VCS throughput timing subject to traffic loads, blocking probabilities and call distribution during Peak Busy Hour (PBH) & Peak Busy Minute (PBM) conditions
- VCS System Design
- Logical Design –HMI, VCS Structure, Monitoring & Control, Failure Status Detection, Electrical/Mechanical/ Software Design
- Availability- VCS/Elements/Services/ Failures/MTTR
- Maintainability-Software-Hardware
- System Start-up and Recovery

Module 6: VOICE QUALITY REQUIREMENTS

- How is Airspace divided?
- Voice Transmission Quality
- Talker-Echo tolerance.
- One-way voice delay (Telephone)
- One-way voice delay (Radio)
- Syllable Clipping
- Voice Transmission Characteristics
- Voice Frequency Response
- Cross-talk
- Noise and Hum
- Total distortion, including quantizing distortion.
- Automatic Gain Control (AGC)
- Automatic Level Control (ALC).
- Loudspeaker Voice Quality
- Life Service times

Module 7: RECORDING REQUIREMENTS

- Legal recording
- Recording points within Network
- CWP Short Term Recording
- Optional CWP Long Term recording
- External Recorder Interfaces
- Event logging (properties and operations)

Module 8: VCS CONTROL & MONITORING SYSTEM REQUIREMENTS

- VMCS Functions-Control/Supervision/Configuration Management/ Security Management/Role allocation tool
- Operator Position Profile Configuration
- Archive, technical log and statistics
- VCMS Implementation
- VMCS Performance
- VMCS Human Machine Interface
- Requirements for operating system and software components
- Report and Printing requirements
- Connection to External Central Supervision System-SNMP interface
- Traffic Statistics

Summary of 2nd day- Questions and Answers session

Course code: JSP-EU300

JSP TELECONSULTANCY

Course duration:
6 hours per day with 10 or 20 minute breaks every hour as defined below:

HOUR 1	09.00 - 10.00
BREAK	10.00 - 10.20
HOUR 2	10.20 - 11.20
BREAK	11.20 - 11.30
HOUR 3	11.30 - 12.30
LUNCH	12.30 - 13.30
HOUR 4	13.30 - 14.30
BREAK	14.30 - 14.40
HOUR 5	14.40 - 15.40
BREAK	15.40 - 16.00
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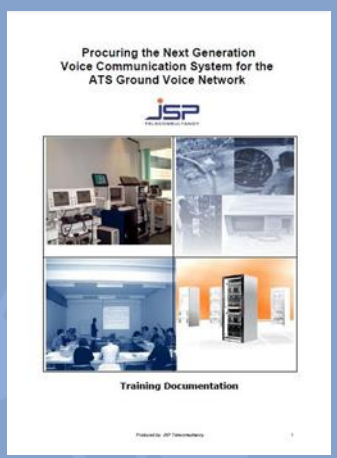

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Detailed outline DAY 3

A typical day starts at 09h00 and finishes at 17h00.

9	TEST AND DEVELOPMENT VCS SYSTEM	10	TRAINING VCS SYSTEM	11	CWP HUMAN-MACHINE INTERFACE - OPERATIONAL	12	SAFETY
	15 minutes		15 minutes		120 minutes		30 minutes
13	SECURITY	14	ENVIRONMENTAL CONDITIONS	15	SUPPLIER SUPPORT SERVICES	16	QUALITY ASSURANCE AND QUALIFICATION
	30 minutes		30 minutes		60 minutes		30 minutes

Module 9: TEST AND DEVELOPMENT VCS SYSTEM REQUIREMENTS

- Purpose, Architecture , Interfaces and CWPs
- Telephone/Radio/Recorder Interfaces
- Independent VMCS and its operation
- Operation & functionality of Test & Development system

Module 10: TRAINING VCS SYSTEM REQUIREMENTS

- Purpose, Architecture , Interfaces and CWPs
- Simulator Training Operator Positions
- Simultaneous Training Session Capability
- VMCS functionality for Training System
- Operational Configuration Simulation
- Identical Tel/Radio functionality and Visual aspects as Main System.
- Operation and Functionality of the Training System

Module 11: CWP-HMI OPERATIONAL and TECHNICAL REQUIREMENTS

- HMI modes-Split/Combined Radio/Telephone
- Display Customization /Customization Tools
- Dynamic Display Visual features
- Dynamic Display Installation/ Mechanical features
- Control Panel - Functional Requirements
- Functional /Message and Information areas
- Control Panel - Radio Specific Requirements
- Operational area- Visual aspects- Capacity, Radio Frequency Keys
- Operation Area - Functional aspects- Basic Frequency Control, Radio Frequency key control window, Delete/Change Assigned Frequency Facility, Main/Standby Radio Switchover, Transmitter & Receiver Channel Group Configuration and Control, BSS Manual Functionalities
- Radio Function Keys –Control aspects- Coupling, Uncoupling., Duplex and Simplex Cross-coupling mode changeover , Enable /Disable Aircraft Call Precedence over Controller Transmissions (PTT),
- Specific Requirements
- Local and Neighbouring Loudspeaker Mute function during transmission, Headset/Loudspeaker Selection, Alarms and Rejection Notifications
- Control Panel - Telephone Operational area – Visual Aspects, Capacity, DA and IA Keys
- Operational Area – Functional Aspects- Direct/Indirect Access/Instantaneous Access/Override Call Control
- Telephone Call Queue Stack and Call Display
- Telephone Function keys area
- Mixed Radio/Telephone Audio Function
- Telephone Audio Output Device Function
- Mute Ring Function
- Last Resort call key
- Microphone On/Off Toggle function
- Audio progress tones
- Role/Configuration Setting keys
- Coach/Trainee Override Function
- Short Term Recording
- CWP Plug Panels
- Audio devices
- CWP Status/Indication response times

Module 12: SAFETY REQUIREMENTS

- Safety Management System.
- Safety Standards
- Safety Management Plan.
- Safety Management Process.
- Safety Reviews.
- Safety Audits.
- Configuration and Change Management.

Module 13: SECURITY REQUIREMENTS

- Virus/Malware free SW
- Local and Site Wide Failure contingency
- Security logs/ Coding
- Security Coding
- Source code Review
- Intrusion tests
- Software integrity

Course duration:
6 hours per day with 10 or 20 minute breaks every hour as defined below:

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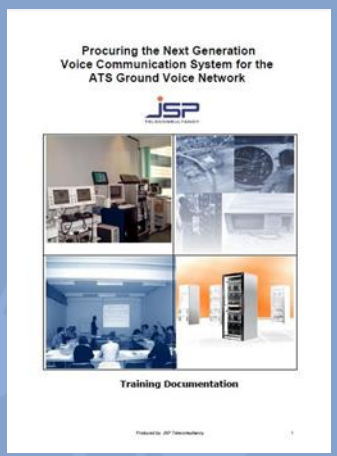

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- Account and Password Management
- Permissions/Remote Access
- Backup/Restore
- Logging /Audit Trial
- Software Release process
- Scanning/Firewalls/Anti-Virus

Module 14: ENVIORNMENTAL CONDITIONS REQUIREMENTS

- Cabinets/Racks/Cables/Connectors /Cooling system/Power Supplies,/ Earthing/ Heat Dissipation/System Weight/Dimensions
- System Accessibility/ Card insertion/removal
- Main Distribution Frame/ Cabling Routing
- Electrical Environment/ Electrical Protection
- Electromagnetic Compatibility
- Noise generation
- Storage and Operating ambient temperatures
- Relative Humidity/Altitude
- Hazardous Substances Declaration
- Materials used/ Toxicity/ Glass/Fungus/Plastics /Colours and finishes
- Vibration and Shock
- Packing removal/System Decommissioning/Removal
- Recycled materials/ Recycling
- Certification and CE marking

Module 15: SUPPLIER SUPPORT SERVICES REQUIREMENTS

- Maintenance Level definition
- Documentation
- Training
- Technical Assistance
- Software Corrective Maintenance
- Software Evolutions
- Hardware Repairs
- Hardware Provisioning – System Expansion
- Obsolescence Management
- Maintenance Tools
- Contractual Framework

Module 16: QUALITY ASSURANCE ANS QUALIFICATION REQUIREMENTS

- Quality Assurance
- Hardware/Software
- Requirements Traceability
- Qualification Procedures
- Test and Validation
- Problem Reporting
- Test Documentation
- Test Environment/ Test Tools
- Test Conduct/Witnessing
- Functional/Performance Test Definition
- Site Acceptance Testing
- Regression Testing

Summary of 3rd day-
Questions and Answers session