Geographic Information - Production Partnership Management Guide

<Working Draft> guide for the application of Production Partnership Management methodology

Change history

Version	Date	Summary of change
1.0d	Nov 2007	Third draft

Distribution

Contents

Foreword

This document has been prepared by Ordnance Survey, the national mapping agency of Great Britain with the assistance of partners in EuroSDR and EuroGeographics. A workshop will be held at Ordnance Survey in November 2007 to encourage broader participation in consideration of the application of Production Partnership Management (PPM) methodology and to agree this best practice through the acceptance of this document. This document may then be taken forward by the GI industry with the intention of submission as a draft International Organization for Standardization (ISO) Standard.

Introduction

History of Production Partnership Management

With ever increasing demands in value and quality in the Geographic Information (GI) market we need to manage our production processes more effectively in an environment that embraces continual improvement. Innovation and continual improvement should be balanced rather than replaced with control.

Production Partnership Management (PPM) was born from the lessons learned from a less than successful contract to supply geographic information let by Ordnance Survey, the National Mapping Agency of Great Britain. That contract started with a traditional supplier customer relationship where suppliers were presented with the requirements. The risk of inability to deliver was mitigated by spreading that risk across several suppliers and those suppliers were encouraged to provide their own solutions with limited intervention.

Part way through this contract Ordnance Survey realised that they could not just provide their requirements and expect the supplier to be able to meet their complex demands. Throughput was lengthy, backlogs soon built up and supporting the suppliers was difficult given their numbers. Ordnance Survey leant that they had to work with a limited number of suppliers more closely, to assist in their understanding of those requirements as well as the development of their processes. The emphasis had shifted. How could both parties work together to mutually beneficial outcomes?

At about the same time Ordnance Survey's department responsible for capturing and maintaining GI started using lean management techniques (see Annex A) to improve productivity. It was recognised that in today's business world it was complete supply chains that competed. The product or service was not the culmination of one organisation's efforts; it was the culmination of the entire supply chain. In order for the product or service to compete in the global economy the whole supply chain had to take part in that competition - to be the best it can be.

PPM was developed from these needs, originally to manage contracts let to external suppliers but it was soon found that with its focus on meeting customer requirements through committed support and process management it could equally be applied to Ordnance Survey's internal production processes and suppliers.

PPM has now become a useful tool for proactively supporting GI production processes and the people that deliver value to the customer.

General

This document has been drafted broadly in line with ISO9004:2000, *Quality Management Systems – Guidelines* but with specific consideration to Geographic Information and in particular ISO19113:2002, *Geographic Information – Quality Principles* and ISO19114:2003 *Geographic Information – Quality evaluation*. This document emphasises the need for the control of any production process intending to add value to a GI dataset. This document concentrates on:

Section 4 identifies the principles of PPM. Section 5 provides the PPM model with Section 6 outlining the responsibilities within the relationship between the supplier and the customer. Section 7 identifies how a production process may be accredited by the customer to meet their requirements. Section 8 introduces the incremental levels of accreditation that provide increasing confidence in a processes ability to deliver to the customer requirement consistently. Section 9 describes how accreditation should be maintained once achieved.

1 Scope

This is a guide to a method of managing the production of geographic information as a partnership between customer and supplier termed here Production Partnership Management. The methods described in this guide relate to:

- The customer requirement
- The quality of the process delivering the product to the customer requirement
- The quality of the production process output (product)

Fundamental to the partnership is the accreditation of suppliers by customers. Three levels of accreditation are described; basic, operational and full.

This guide is applicable to all types of geographic information. For example *Topographic data, Digital data, maps, charts and textual documents*

Application for consideration at the November workshop

It is for use by customers of geographic information and suppliers of geographic information whether internal or external to a customer's organisation. It is applicable to commercial and non-commercial arrangements wherever there is an agreement between customer and supplier for the production of geographic information.

Although this guide is for the production of geographic information, the principles described here may be applicable to other production processes.

2 Terms and definitions

More terms may be defined (or repeated from other documents for clarity). For consideration at the November workshop

For the purposes of this document, the terms and definitions given in ISO 8402, ISO9000, ISO19113 and ISO19114 apply. Some specialized terms and additional terms are used and are defined in this section.

2.1 Accreditation

Process in which a customer satisfies itself that its suppliers, both external and internal, with an effective level of ongoing support, are capable of consistently delivering Geographic Information to the required quality, on time, in the necessary volumes and at the right cost.

2.2 Process

Overall activity being applied to GI in its creation or maintenance (for example photogrammetric survey). This process may be broken down further into more elemental activities which are defined here as **sub processes**.

2.3 Sub process

Activity elements of a **process** (for example in the case of photogrammetric survey, air triangulation).

2.4 Production Partnership Management

Method of customer and supplier working together to ensure the customers requirements are met by the supplier's processes in a relationship that fosters continual improvement for mutual benefit.

3 Abbreviated terms

AQL Acceptance Quality Limit [ISO 3534-2] sometimes referred to as Acceptable Quality level

ISO International Organization for Standardization

PPM Production Partnership Management

QC Quality Control

QA Quality Assurance

4 Principles of Production Partnership Management

4.1 Work collaboratively

Customers of GI and suppliers should work together to manage GI delivery and overcome any issues that may arise and to improve the end-to-end process. For example sharing experiences and use of hardware and/or software (for instance automated GI validation software tools). Working collaboratively helps to mitigate the risk caused by:

- complex data specification
- significant data handling during production
- Specification requiring some educated interpretation by the supplier's workforce

4.2 Improve quality

All processes should have clearly defined and understood AQLs. Error trends should be monitored and fedback to production areas to improve performance.

4.3 Reduce costs

All parties should work to:

- Reduce waste
- Identify and remove non value adding activity within production processes
- Minimise necessary non value adding activity
- Increase value added activity

Cost savings should be passed on to mutual benefit.

4.4 Improve workflow

All parties should work to identify and reduce or if possible remove bottlenecks and stop inventory build up thus reducing the time taken data to complete the process. Suppliers should then be better equipped to deliver to increasingly tight deadlines, at a rate requested by the customer.

All parties should ensure that variance in the supply of work can be handled effectively without detriment to an ongoing requirement in the future. For example through offering production work to that is not greater than 50% of the total capacity of the supplier resources and/or workforce may be switched to other work, enabling the supplier to retain key skills and knowledge.

4.5 Reduced post processing

Customers of GI and suppliers should work together to minimise additional processing (for example rework). Defects should not be knowingly passed on or accepted.

5 PPM Model

Place marker - Simple graphic model for consideration at the November workshop

6 Responsibilities of customer and supplier

6.1 Customer

6.1.1 Product specification

In the PPM process the customer of GI is responsible for defining the version controlled specification for the work to be done. This should include what constitutes the acceptable quality levels for the product and how the work is to be tested.

Any changes to the specification should be notified to the supplier.

6.1.2 Education

Once the specification of the work is known the customer is responsible for educating the supplier, ensuring they have all the necessary knowledge to complete the work successfully.

This knowledge should be checked initially by the customer testing the some pieces of completed work before full production starts.

Feedback and extra education should be provided as necessary.

6.1.3 Continual support

At all times throughout the process, the customer should provide further clarification or education to producers on any specification issues that may arise.

The customer should monitor delivery to schedule throughout the process.

The customer should assist the supplier to make improvements to their process, for example through a process review. A process review differs from a quality audit in that a process review concentrates in more detail on the mechanics of the process using Lean Principles.

6.1.4 Quality Assurance

Ongoing sampling of the supplier's product (as required) to ensure that AQLs continue to be met.

Provision of timely acceptance reports and incident reports to the supplier

6.1.5 Quality Audit

Independently ensuring that the supplier's process is following stated methods.

6.1.6 Awarding PPM accreditation

Assuring both the customer and the supplier that the supplier processes are able to consistently deliver to the customer requirement.

The exact nature of the evidence required should depend on:

- Complexity of the customer requirement
- Criticality of the delivery schedule
- Customer confidence in the supplier

6.2 Supplier

6.2.1 Understanding the product specification

The supplier should satisfy themselves that they have the necessary understanding of the specification and delivery schedule to enable them to produce the required quality and volumes.

Advice from the customer should be sought whenever an uncertainty about the requirements is encountered.

6.2.2 Quality plan

Suppliers should develop and document all the necessary production processes (including management elements) to meet the needs of the customer.

The documentation should be version controlled.

The documentation should be made available to the customer.

6.2.3 The workforce

The supplier should ensure they have the necessary workforce with all the skills required to complete the task.

The workforce should be given the appropriate training, coaching and mentoring on the required specification. Training should be validated to confirm understanding.

Prior to commencing work in a live production environment checks should be made to ensure that each member of the workforce is capable of meeting the AQLs and volumes required. This confirmation would lead to the award of individual accreditation. See Section 8.3.2, Individual accreditation.

Note: Individual accreditation should be used as an opportunity to develop and improve the knowledge and skills of an individual within the workforce. It should not be seen as an opportunity to find fault.

6.2.4 Quality control

The supplier should monitor all sub process outputs, both in terms of GI quality and volumes. Appropriate action should be taken as soon as any issues are identified. The customer should be kept informed of all these issues.

6.2.5 Continual improvement

The supplier should constantly look for methods to improve quality and reduce costs. These should be shared with the customer.

The supplier should respond and act timely to customer incident reports and feedback.

The supplier should instigate process reviews and implement improvements.

6.2.6 Process change management

The supplier should be responsible for communicating any proposed changes to their process to the customer. This will enable the customer to assess for any downstream impact (positive and negative) in terms of GI quality, schedule or volume.

6.2.7 Supporting accreditation

Ensuring all the customer specific requirements for accreditation are made available. These should include:

- Access to documentation (eg Quality Plan, QC monitors, training records, process mapping)

- Access to workforce (eg for process review assistance, confirmation of understanding of specification)

Note: The process of accreditation should be designed to develop and improve the supplier capability. It should not be seen as an opportunity to find fault.

7 Accrediting a process

7.1 Purpose

The purpose of accreditation is to ensure that the aims of PPM can be met and that the three elements of a production process are effectively managed. The three elements are:

- Manage the requirements

- Manage the demand

- Complete the work package (figure 1).

If these three elements are effectively controlled the customer should be satisfied that the supplier output will consistently meet the customer requirement.

The standard that the customer is accrediting the supplier to is set by them (the ability of the supplier to meet the requirement).

The steps identified in figure 1 are expanded upon in Annex B. The elements that should be tested as part of the customer's supplier accreditation process should depend on:

- Complexity of the customer requirement

- Criticality of the delivery schedule

- Customer confidence in the supplier

This section provides examples of evidence that may be sought for a customer to accredit a supplier

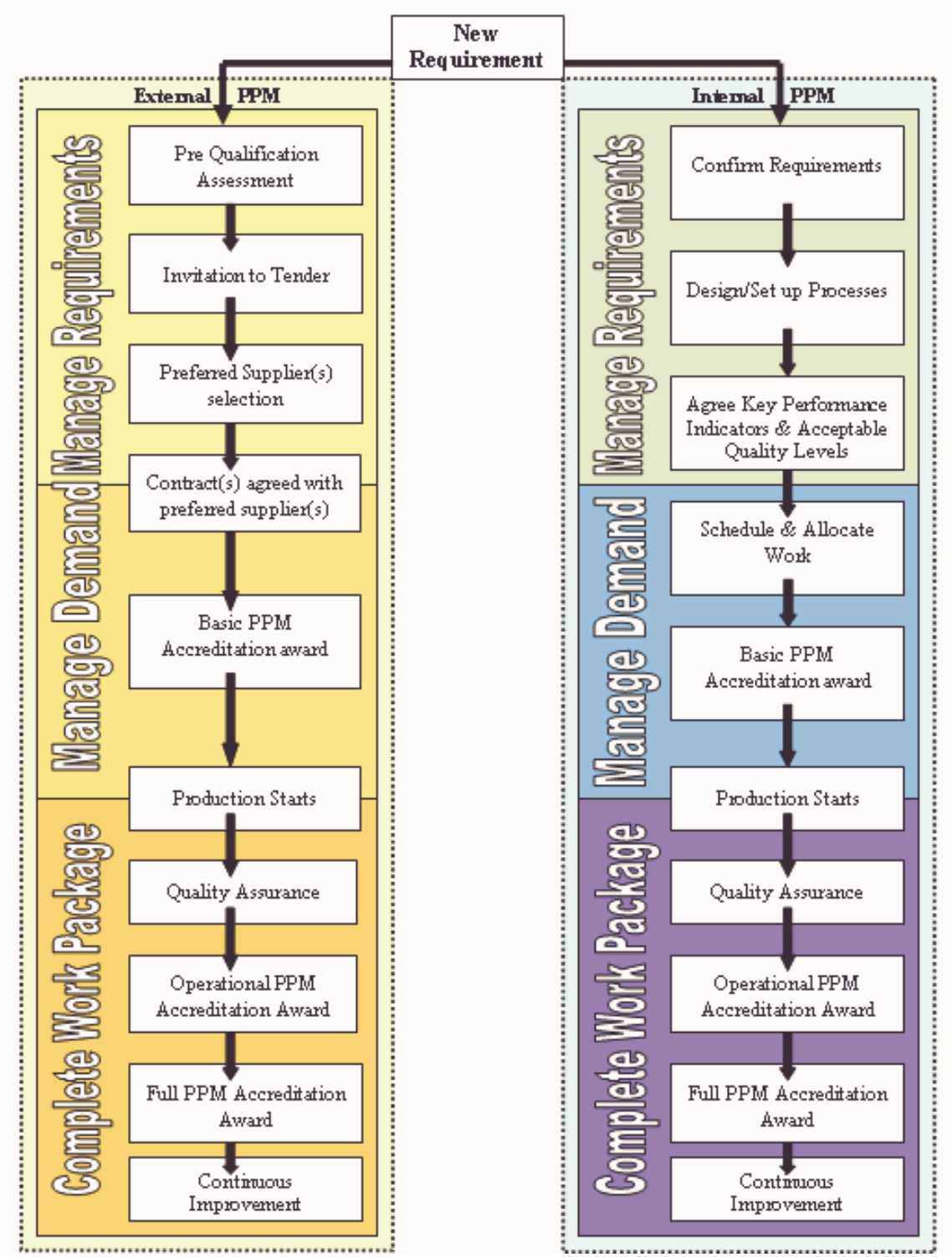

Figure 1 Production Partnership Management workflow scenario (customer perspective)

7.2 Confirm the requirement

7.2.1 General

For accreditation purposes the customer should seek evidence to ensuring that the customer requirement is well understood by the supplier. The following set of inputs should be used to confirm the customer requirement.

7.2.2 Product specification

A detailed description of what needs to be delivered. They should be as comprehensive as possible, include sample datasets, show examples and make use of images. It should not be assumed that the supplier has an understanding of the landscape or culture of the geographic area in question.

7.2.3 AQLs

AQL statements should describe what quality is expected from the process as a whole. Then as the process is developed, what quality is expected from each stage of the process, and eventually from individual operators.

The GI quality elements identified in ISO19113, Geographic information – Quality principles (2002) and the measures provided in ISO19114, Geographic information – Quality evaluation procedures should be used to frame the AQLs and the tests for any process or sub-process output.

Other quality elements or sub elements should be introduced as necessary.

The statement should clearly identify what constitutes a failure in quality for each stage in a production process.

An example of an individual operator's AQL statement (currently in use within a GI production process) is provided at Annex C. This is provided as an indicator of the consideration of data quality at the most granular level.

7.2.4 Delivery schedule

The delivery schedule should define in detail when it is expected that individual elements of the complete job should be started and completed. Any dependencies should be made explicit.

7.3 Design and set up processes

7.3.1 General

How that process is planned to operate should be clearly understood. This understanding should be able to be demonstrated. Quality audits and or process reviews can be carried out to confirm how the process is operating and if improvements can be made.

7.3.2 Process design

A series of process maps should be produced based upon Value Stream Mapping [1] methodology. These should range from high level, showing the flows between work areas, to more granular level that show the detail steps of an individual element of work. The process maps should identify who is responsible for each sub-process, what each sub-process does, what the inputs and outputs of the sub-process are, where data is stored and the average and maximum time for each sub-process. The customer should be able to assist in this work if requested by the supplier.

7.3.3 Standard operating procedures

Standard operating procedures as a minimum should document how a trained operator handles variation in their part of the process. That is what decision they should make in a given set of circumstances. The intention is to reduce the level of variance in the process.

Note: Standard operating procedures should not need to cover every element of the operators activities. This is expected to be covered through sufficient and relevant training.

7.3.4 Quality Control

The QC points in the process should be clearly identified. For the supplier the amount of quality control carried out should reflect the level of confidence in the process, associated sub-process and operators. For example an automatic process run by experienced operators should need less quality control than a manual process run by inexperienced operators.

The criticality (in terms of impact on the rest of the process and or the cost of failure) of the sub-process should be reflected in the amount of quality control.

The action to be taken if work fails quality control should be recorded.

If relevant to the supplier process the customer should make any tools that could be used for QC available to the supplier. For example validation software.

7.3.5 Training

Training plans should detail operator training requirements. Evidence of training consolidation (for example operator test results) should also be retained. Training consolidation should occur prior to taking up any work within a process.

Note: Well managed training is essential in minimising variance in the process.

7.3.6 Risk management

The supplier should be able to demonstrate that they have considered the risks to process and have taken sensible actions to mitigate such risks.

7.3.7 Change management

All processes need to be able to change in a controlled manor. Changes to processes and sub-processes should be agreed, documented and communicated to the appropriate staff in an agreed way. Any training such changes require should be shown to have happened at the appropriate time. The version, or date, of all documentation should be visible to ensure that the workforce is always working with the most up-to-date documentation.

7.3.8 Process improvement

Suppliers should constantly look to improve there processes and sub processes in order to improve the quality and/or reduce the costs. Customers should seek evidence of the supplier looking for improvement. For example evidence of improvement plans, use of the Deming Cycle (Plan, Do Check, Act) [2], Lessons learnt logs, process reviews and the sharing of best practice within the process and with the customer.

8 Accreditation levels

8.1 General

Levels of PPM accreditation have been identified that may be awarded by the customer against any given process. These levels are incremental, from basic to full. As the level ascends so to does the level of confidence in the process.

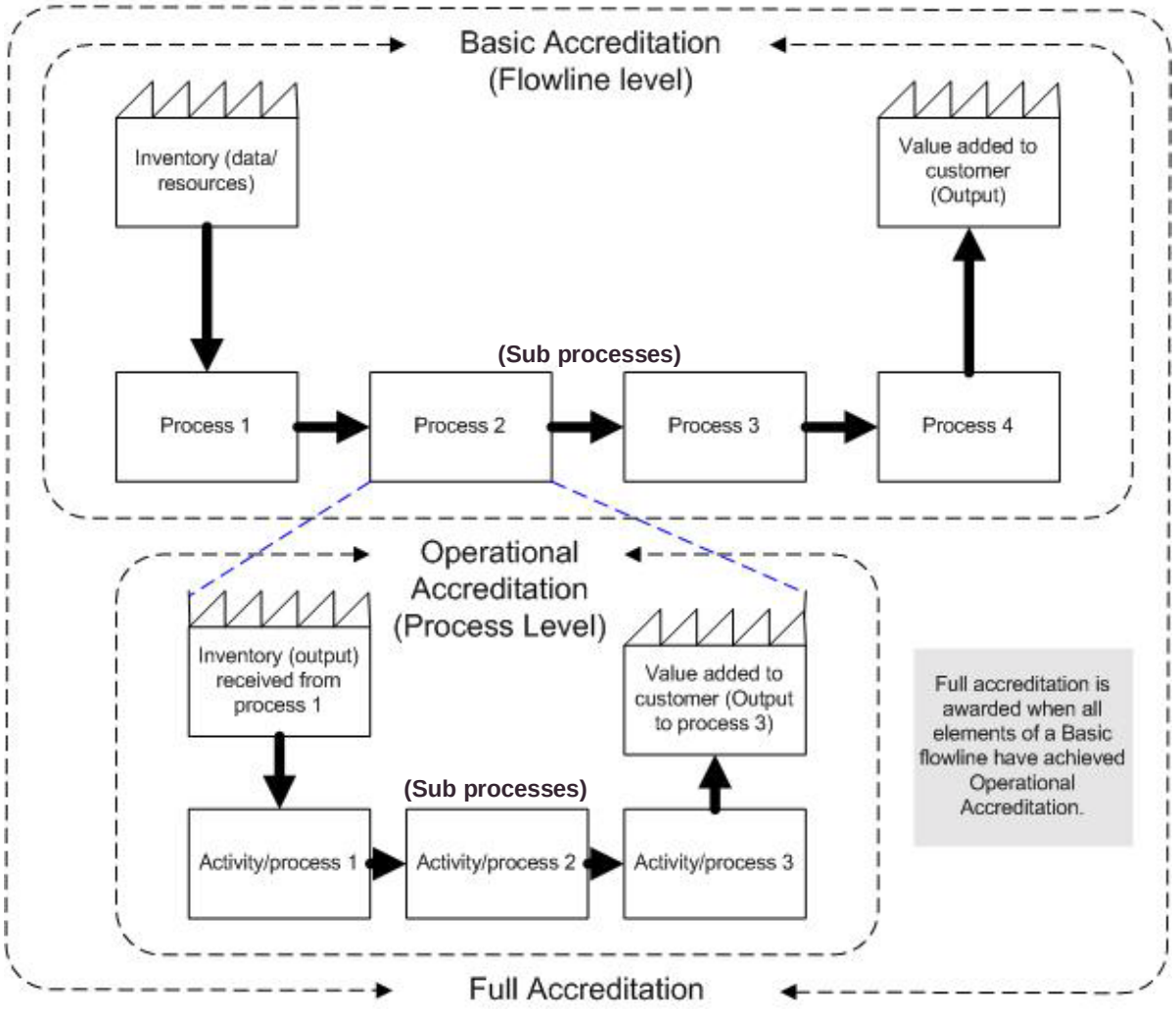

Figure 2, Levels of process accreditation

8.2 Basic

Basic PPM accreditation should be the first level to be awarded by the customer (figure 2). Its objective is to rapidly reassure the customer that the supplier is capable of meeting general 'day-one' requirements. It should usually be awarded within three months of the start of the process. This level applies to the overall process that will deliver to the customer.

To be awarded at this level the supplier should be able to demonstrate to the customer that they have understood the specification, AQLs, and delivery schedule and have a process in place that will deliver the volumes and quality necessary. Results of initial quality assurance testing and initial deliveries should be analysed (by the customer) together with the high level documentation about the overall process, its change management and improvement plans.

8.3 Operational

8.3.1 Sub processes

To achieve operational accreditation the supplier should provide evidence of the following:

- Identification of each sub process and how these fit together (figure 2). The level of granularity required will depend on the process complexity and dependencies.
- Relevant process controls.
- Track record in delivering GI which meets the customer requirement

The Operational PPM accreditation process should start immediately after the awarding of basic PPM accreditation and should be completed within six to nine months of the start of the process.

8.3.2 Individual

Individual PPM accreditation is a subset of operational PPM accreditation.

The aim of individual PPM accreditation is to ensure that the workforce is adequately trained, coached, mentored and supported to be capable of delivering to the customer requirement in terms of GI quality and schedule

It is the supplier's responsibility to accredit individuals. To achieve individual accreditation for a sub-process the individual should have completed all the necessary training for that sub-process.

The individual should have demonstrated that they have the necessary knowledge and skills to be capable of constantly meeting the 'local' production AQLs and output volumes required of the sub-process. Annex C provides an example of local production AQLs for an individual.

The individual should be able to demonstrate basic knowledge of how the process is managed, be able to point to monitors and metrics of performance, and be actively involved in continuous improvement.

Note: Individual accreditation should be used as an opportunity to develop and improve the knowledge and skills of an individual within the workforce. It should not be seen as an opportunity to find fault.

8.4 Full

For full accreditation the supplier should be able to demonstrate that over 80% of the workforce working on that sub-process have individual PPM accreditation and those that do not are being actively monitored and expected to achieve individual accreditation.

9 Accreditation maintenance

9.1 General

To accredit a process it is important for the customer to monitor the results of that process. To that end analysis of quality assurance results should be made, together with analysing the 'actual to planned' delivery of data. This analysis should be as detailed as possible and should look for trends. Feedback on these trends should be made to the supplier.

Once awarded accreditation should be supported in the following ways:

9.2 Monitoring

9.2.1 Quality audits

The responsibility of the customer, regular audits of processes should be carried out. The interval between audits should be dependent on the confidence of the customer in the ability of the supplier. This should be informed by the results of previous audits and QA test results.

Auditors should inspect documentation and cross check these against what they observe in the workplace. Auditors should observe and interview a cross section of the workforce employed on the sub-process. Auditors should report their findings in one of three categories;

Major - where a failing has the potential to cause significant impact to the customer's data. It is suggested that the supplier should have seven days to resolve these issues to the customer's satisfaction.

Minor - where a failing has the potential to cause some impact to the customer's data. It is suggested that the supplier should have 21 days to resolve these issues to the customer's satisfaction.

Observation - where in the auditor's opinion there is a potential for improvement. It is suggested that the in these cases the supplier is expected to provide comment, with reasons for any inaction, within 90 days.

9.2.2 Quality assurance testing

The level of GI quality assurance testing will be dependant on the customer's level of confidence in the supplier. Feedback from all tests should be given to the supplier using one of the three categories above or by indicating that no issues were found.

9.2.3 Process reviews

Process reviews should be conducted at intervals dependant on the customer's confidence in the supplier's ability to produce the required volumes and quality. They should also be used if there are issues around cost. The supplier and customer should share experiences in order to seek ways of reducing waste and increasing value added time.

9.3 Support through partnership

The supplier and customer should seek to work in partnership to overcome issues and improve performance. The overriding aim is always to share the benefits of improvements between supplier and customer.

The customer should provide feedback on performance, and clarify requirements as required. The supplier should assist the customer to improve on the specification, AQLs levels and the delivery schedule. Best practice should be shared.

Communication within a partnership should be considered essential and should be managed effectively by both parties. For example through a single point of contact.

9.4 Withdrawal of PPM accreditation

In some instances PPM accreditation should be suspended or withdrawn.

Note: This should only occur following sufficient customer support that would normally be expected to either prevent or rectify the issue or issues.

Typical issues that may invoke a withdrawal of PPM accreditation:

- A major breakdown in the control of a process or sub-process
- Insufficient action within the agreed timescales on reported failings
- Repeated failings of a similar type

Note: The mechanics of withdrawal of PPM accreditation should be written into the terms of the contract between customer and supplier.

A Lean principles

This document promotes the adoption of Lean management principles in production processes. Lean management is about smoothing the flow through the supply chain, assuring quality at each and every link in the chain and identifying and removing all non-value-adding activity. There are Five Lean Principles [1]:

Value to the customer; specify what it is about the product or service being supplied that the customer values. Recognise that customers are buying solutions not processes. Suppliers may have a better idea than the customer of how to deliver the solution.

Value Stream; map the supply chain from end to end and design out any non value adding activity. Ensure that all interfaces have a common understanding of the deliverables.

Flow; keep all work moving by reducing bottlenecks and inventory ensuring even flow. For instance do not accumulate inventory towards the end of the period. For example 90% of deliveries made in the last few days of the period.

Pull; the customer of the GI takes the data at the rate of consumption they desire; hence the suppliers only produce and deliver at that rate of consumption.

Perfection; insist on continuous improvement in all processes by enforcing the use of the Deming Cycle (Plan, Do, Check, Act) [2], sharing best practice and quality circles [3].

From these principles more specific aims and goals can be identified for any production process. These have been incorporated into PPM.

B PPM workflow scenarios

The following scenarios provide more detail of an example workflow (activities and steps) from a new requirement being identified through to delivery to the customer in a PPM relationship, including accreditation of the supplier processes.

These scenarios also provide suggested customer roles that would be responsible for managing the activities.

B.1 External supplier workflow scenario

B.1.1 Manage requirements

Roles	Steps to PPM accreditation	Activity
	New Requirement for external resource is identified	Budget and timescale identified
Procurement Specialist, Contracts Manager, Process Design Engineer, Production Specialist.	**Tender prepared**	Requirements gathered. Project plan created.
	Prior Information Notice	High level information issued in for example The Official Journal of the European Union (OJEU) and to known potential interested parties. Potential Suppliers declare interest.
	Pre Qualification Questionnaire issued	Questions designed to confirm supplier ability to: • Work with customer using PPM principles • Manage Risks • Customers work to be less than 50% of supplier's workload. • Confirm business continuity e.g. Switch resources to other work to counter variation in supply of work from Customer. • Provide customer support
	Respondents to PQQ assessed	Responses assessed
	Invitation To Tender (ITT) issued	Terms and Conditions provided with requests for, Quality Plan, Process maps/flowcharts/Value Stream Maps, Risk Management plan
	ITT responses evaluated	Responses assessed
Procurement Specialist, Contracts Manager, Production Specialist.	**Preferred supplier(s) selected**	Short list of potential suppliers for tender negotiations chosen. Supplier sites visited to confirm set-up facilities. Test Data supplied and quality assured

B.1.2 Manage demand

Roles	Steps to PPM accreditation	Activity
Procurement Specialist, Contract Manager	**Contract Agreed with preferred supplier(s)**	Agree; Terms & Conditions, service levels, schedules including costs, volumes, Key Performance Indicators and Process Audits. Agree start date. Agree PPM accreditation time frame.
Supplier Manager, Quality Manager, Trainer, Production Specialist	**Supplier(s) Set up Processes**	Where appropriate suppliers provided with customer edit software and testing tools/software. Training on specifications, production/process support provided.
Supplier Manager, Quality Manager, Production Specialist.	**Initial (Basic) PPM Accreditation award**	Collection, presentation and evaluation of evidence. Assessment within in work area location, production/process support provided.
Supplier Manager, Programme Manager	**Production starts**	Production contract 'consumables' provided to supplier, production commences, production progress monitored.

B.1.3 Complete work package

Roles	Steps to PPM accreditation	Activity
Supplier Manager, Programme Manager	**1st data delivery**	Data received and quarantined
Quality Manager	**Quality Assurance**	Data Validation and Quality Assurance including software checks, visual checks and field checks.
Quality Manager, Supplier Manager	**Incident/Acceptance Report/Feedback**	Failures against agreed AQLs reported back to supplier with request for investigation and remedial action. Supplier provides report back to customer on reasons for error and actions taken to prevent further occurrence.
Quality Manager, Supplier Manager,Programme Manager.	**Quantity, Quality target criteria met**	Volumes of consecutive deliveries of work confirm competency (to agreed AQLs, volumes and schedule)
Quality Manager	**Operational PPM Accreditation award**	Collection, presentation and evaluation of evidence
Quality Manager	**Full PPM Accreditation award**	Collection, presentation and evaluation of evidence
Supplier Manager, Quality Manager, Process Design Engineer.	**Partnership working throughout contract**	Trend analysis, monitors, feedback reports, best practice, production/process specialist support, communication of issues
	Audit/Process Review/Support visits to supplier	Quality audit of process, process review Process Review skills Continuous Improvement.
Supplier Manager Quality Manager	**Change to Process**	Notifications of changes & impact assessment including impacts on quality/speed of delivery.

B.2 Internal supplier workflow scenario

B.2.1 Manage requirement

Roles	Steps to PPM Accreditation	Activities
Product Manager	**Product Management identifies requirement.**	Customer liaison
Specifications Manager, Production managers,	**Confirm Requirements**	Stakeholders identified, request evaluated. Budget and timescale identified Deliverables identified.
Process Design Engineer, Production Manager, Trainer, Production Specialist.	**Design/Set up Processes**	Process design and development against evaluation of customer requirements. Process & Value Stream Maps & Quality Plan created. Training on hardware, software and specification identified and delivered to editors. Trial to determine the processes, QC &QA requirements.
Production Manager Standards & Compliance Manager	**Agree Key Performance Indicators & Quality Levels**	Production targets, milestones and delivery dates agreed. AQLs set. Monitors put in place. QC tests in place

B.2.2 Manage demand

Production Manager	**Schedule and Allocate Work**	Work scheduled to ensure delivery within the required timescales. Scheduled work package allocated to specified resources.
Production Manager, Quality Manager	**Initial (Basic) PPM Accreditation award**	Collection, presentation and evaluation of evidence. Assessment of process in work area location.
Production Manager, Programme Manager	**Production Starts**	Production progress monitored

B.2.3 Complete work package

Roles	Steps to PPM Accreditation	Activities
Production Manager	**In process QC**	QC built into process where appropriate to confirm quality delivered at source. Monitors in place, to show rates, error trends, individual accreditation.
Production Manager	**1st delivery**	GI validation, QA (a fuller inspection than would normally be required)
Quality Manager	**QA**	Quality Assurance tests, before delivery to customer. Assess work of Quality Control (the sub process)
Quality Manager	**Incident/Acceptance Report/Feedback**	Failures against AQLs reported and fed back to source for correction. Actions taken to prevent further occurrence eg process review – change/further training/best practise/ individual performance management.
Quality Manager	**Quantity, Quality target criteria met**	Volumes of consecutive deliveries of work confirm competency (to agreed AQLs, volumes and schedule)
Quality Manager, Production manager	**Operational PPM Accreditation award**	Collection, presentation and evaluation of evidence
Quality Manager, Production manager	**Full PPM Accreditation award**	Collection, presentation and evaluation of evidence
Quality Manager, Process Design Engineer.	**Audit/Process Review/ Continuous Improvement**	Quality audit of process, process review, continuous Improvement.
Production Manager, Quality Manager, Process Design Engineer.	**Change to process**	Notifications of changes & impact assessment including impacts on quality/speed of delivery.

C Example AQL statement for individual PPM accreditation

Introduction to this document: The following is based on an extraction of a document currently in use. Using this document the operator (in this instance a field surveyor) can identify the AQLs required for their part in the process of maintaining GI data. The principle for the development of this document was : if the operator can affect the quality of a GI element or sub element it should be measured as part of the PPM accreditation process.

As it is a real document some of the terms used are unique to a particular supplier and customer, for example 'TOPO' and House Unit Count. Nor do all the test descriptions refer explicitly to ISO 19113 Standard quality elements. Although the language has been couched in a way familiar to the supplier's operators the underlying principles remain the same.

As a single operator will edit few features as part of a single task the use of percentages has been avoided. Instead the impact of the error is considered and then weighted accordingly across a task.

To ensure that all work meets the required standard your revision will be subject to quality control checks.

Work will be tested for each product layer that applies to the completed task and will be assessed against the GI quality tests identified below. Every instance of an error assessed against these measures will be given an individual value ranging from 0.5 to 5 according to the severity of error. At the end of testing, the values will be added up for each layer and if the total equals or exceeds 5 then the job will be classed as having failed for that layer.

The AQL for each layer is **4.5**

A layer is deemed to have passed with a total error value of **4.5** or less.

The quality checker will return the job for rework if any individual error item can be corrected without further customer impact. For every layer tested, pass or fail, a feedback report, written by the quality checker, will be sent to the operator.

All results from quality control checks will be entered into a database, maintained and monitored by the quality checking team. They will collect statistics, write reports and monitor error trends to forward to line and senior managers at appropriate intervals.

Product	Test description	Error Value per item
Address	Address incorrect addition or retained in error	5
	Alternative address attribution omitted or retained in error	2
	Available address not matched to feature	1

Product	Test description	Error Value per item
Road network	Road Routing Information	
	Critical information - Incorrect addition or retained in error	5
	Non-critical information - Incorrect addition or retained in error	2
LUC	Land Use Change – missing or incorrect line entries	2.5
Topo	Administrative Boundaries – incorrect addition, removal, repositioning or renaming.	5
	mereing description or symbol missing or changed incorrectly.	1
Topo	Area label, line, point or text feature serial numbers reused	2
Topo	Bench Mark – retained or removed in error	1
Topo	Completeness – detail with a house unit value of ≤0.25 omitted or retained in error	1.5
	detail with a house unit value of >0.25	5
	omitted or retained in error	
	unnecessary detail added	1
Topo	Topological consistency – detail in error over the edge of tile	5
	errors in classification or coding over tile edge	2
Topo	Attribute accuracy - Feature Level Attribution, incorrect labels, line, text type, point codes or physical levels	
	≥100 features added	2
	<100 features added	1
Topo	Geometric fidelity – Visible error when viewed at scale	5
Topo	House Unit Count – decrease or no increase following edit	5
	incorrect increase ≤+/- 5	0.5
	incorrect increase > +/- 5	1.5
Topo	Line, point or text feature – unnecessary changes	2
Topo	Mean high/low water – incorrect edit or text association.	5

Product	Test description	Error Value per item
Topo	Names & Numbers – incorrect addition, omission or unnecessary changes.	2
Topo	Positional accuracy (Existing Detail) moved when within action limits not moved when outside action limits	2 2.5
Topo	Property Extent Closing Links – incorrect or missing	2
Topo	Relative accuracy – point pairs with errors exceeding values identified in specification	5
Topo	Road Network Line – Incorrect addition, omission, retention or unnecessary changes	2
Topo	Text association – incorrect or missing association	2

Notes on measurement

Sample selection – The level of sampling, the minimum and maximum size of job to be checked and the data to be sampled will be controlled by Accreditation Management.

Test Area – The data tested will be all that updated by an individual operator. It will include all elements of topographic, address, transport network and road routing information that should have been updated.

Geometric fidelity & Relative accuracy – Guidelines as laid down in the surveyors instructions will be followed.

Completeness – When the submitted data is compared against the real world all features within specification for that update that were either complete, or had been completely demolished, at the time of survey will be expected to have been captured. The only allowable exceptions to this are where access has been denied, making capture impossible, or where it was unsafe for the surveyor to update an area.

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