

Dynamic Positioning

A brief IMCA history

IMCA is the international trade association representing offshore, marine and underwater engineering companies.

It seeks to:

- ◆ strive for the highest possible standards with a balance of risk and cost in: health and safety; technology; quality and efficiency; environmental awareness and protection;
- ◆ achieve and sustain self-regulation in the industry;
- ◆ ease the free movement of equipment and personnel globally;
- ◆ achieve equitable contracting regimes;
- ◆ provide the framework for training, certification, competence and recruitment to support and sustain the industry globally;
- ◆ resolve industry issues; and
- ◆ promote co-operation across the industry.

Members include pipelay, heavy lift, diving, remotely operated vehicle, survey and offshore construction contractors, plus various contractors operating specialist marine equipment.

IMCA has two core activities in which all members participate:

- ◆ Safety, Environment & Legislation (SEL) includes monitoring national and international regulatory bodies, circulation of relevant information to members and advancement of industry positions where necessary
- ◆ Training, Certification & Personnel Competence (TCPC) includes a comprehensive framework devoted to promoting safety by defining and encouraging competence in key safety-related positions.

Members join in one or more of IMCA's four technical divisions relevant to their own area(s) of work:

- ◆ Diving
- ◆ Marine
- ◆ Offshore Survey
- ◆ Remote Systems & ROV

IMCA works with a global focus, but also includes regional sections covering the key offshore regions: Americas, Asia-Pacific, Europe & Africa and Middle East & India.

IMCA has published substantial and comprehensive guidance based on its members' experience in a range of related areas. More details on specific activities are contained on this and other information sheets.



By the early 1980s, dynamic positioning (DP) was being used on a growing number of offshore construction vessels and in specialist marine operations where the technology of DP was a crucial part, either because DP was the practical answer for keeping a vessel within precise navigational limits, or because of commercial advantages, perhaps in terms of fuel costs. Over the next decade, the need for DP grew and became a high profile issue in navigational technology, especially as purpose-built equipment started to improve capability and reliability. There was, however, a lack of consistency in how DP control and associated issues were managed and, as the use of DP began to proliferate further, problems arose; sometimes with new users and sometimes as existing users pushed the operational envelope to greater limits.

Specialist consultants were by now acquiring a significant amount of expertise and there was a growing need for all those involved with DP to communicate and assist each other in creating safe and efficient procedures to cope with the exceptional operational requirements of this unique form of ship handling and navigation. In the late 1980s, those involved perceived that need and were working together, informally at first; but by 1990 the Dynamically Positioned Vessel Owners Association (DPVOA) was formed.

It was a small beginning, but as it proved, a fundamental way point in the history of DP. The association began to collate information and expertise. One of its earliest projects was to collect data from 'DP incidents', where something had gone amiss whilst a vessel or unit was in DP. The November 1989 DP systems incidents analysis was the first of what was to be an annual event. This data helped the specialists in the group to address problems in DP operation and to start the development of guidelines to help combat them. By 1993, DPVOA had brought out a dozen publications giving such guidance.

The International Maritime Organization (IMO) was also focused on the importance of DP and in those years DPVOA worked with IMO to help produce the well-known IMO Maritime Safety Committee (MSC) Circular 645, which established international guidelines for vessels with dynamic positioning systems, applicable to all dynamically positioned units or vessels built on or after 1 July 1994. The publication was replicated in the growing DPVOA catalogue.

KEY DOCUMENTS

Guidelines for the design and operation of dynamically positioned vessels

IMCA M 103

IMO guidelines for vessels with dynamic positioning systems

I 13 IMO (IMO MSC 645)

The training and experience of key DP personnel

IMCA M 117

IMCA members have access to these and an extensive catalogue of related documents via a secure website, as well as receiving updates and new guidance automatically as it is published and being able to provide input to the development of such documents.

See www.imca-int.com for details

Now DP operators had some basic guidance on which to construct procedures, but there was still some way to go to deal with all the operational aspects. Three more publications followed, all landmark guidance for DP operations.

In 1995, with a number of offshore issues in common, especially in relation to Diving Support vessels working in DP, DPVOA merged with the International Association of Offshore Diving Contractors (AODC) to form the International Marine Contractors Association (IMCA).

One of the operational issues under consideration was the number of personnel involved who could affect the efficiency of DP operations, not just the DP operator (DPO). IMCA developed guidance document IMCA M 117 entitled 'The training and experience of key DP personnel'. In 1996, this was adopted by IMO in MSC Circular 738 which, together with MSC Circular 645, formed the backbone of international guidance on DP.

A major IMCA publication in early 1999 was IMCA M 103 – Guidelines for the design and operation of dynamically positioned vessels – this being a revision of an earlier DPVOA publication which had followed the work with IMO on MSC 645.

Between 1996 and the time of producing this history (2005), a further 55 guidance documents on DP have been produced by IMCA, forming a veritable encyclopaedia of DP and related station keeping experience.

The art of dynamic positioning has not only moved quickly in keeping with available technology, but the offshore industry has driven that development as exploration and production needed to move into deeper and yet deeper waters. This required still better, task related equipment and expertise, making users and manufacturers continually strive toward more refinements. The resultant changes can be to any or all of the inter-related navigational, control, power or propulsion units that affect a DP system or their subsidiary components. IMCA guidance has to keep up with such changes.

Specific human element issues can arise from all operations. The effects of human interaction have long been understood to be a factor in DP operations and IMCA both studies human issues as a subject in itself and keeps a focus on them when developing guidance on the changing technology, moving at an ever-accelerating pace.

With the evolution of navigational systems presently on a reasonably stable plateau, control, power and propulsion systems becoming more efficient and reliability overall increasing, it could be said that DP operations seem easier, requiring less expertise for all key DP personnel; but as with any technology, to be able to use it safely, one needs to understand it. And, as the technology improves, it sometimes brings its own problems.

IMCA constantly works with its members, who are handling DP in the hard practical and commercial reality of offshore operations, to review its publications and study all relevant issues, bringing out guidance wherever it can to help deal with new situations and changing environments. For example, IMCA is currently working with an international cross-industry group developing guidance on the use of DP on offshore supply vessels. Another example is the current update of both the IMCA M 103 and IMCA M 117 publications mentioned above. IMCA will remain focused on DP issues for many years to come.

ANNUAL SEMINAR

IMCA has held a seminar on dynamic positioning every year since 1993. Over the years this has expanded and developed to become IMCA's Annual Seminar, including sessions on offshore diving and other topics, while retaining a focus on dynamic positioning and related marine issues.

The proceedings of these events form part of the IMCA publications catalogue and give insight into particular technical issues. The proceedings show very well how far the industry has come over the past 12 years.

The seminar is held at varying locations around the world:

- ◆ 1993 Stavanger (see 116 DPVOA)
- ◆ 1994 Amsterdam (123 DPVOA)
- ◆ 1995 London (IMCA M 132)
- ◆ 1996 Houston (IMCA M 136)
- ◆ 1997 Aberdeen (IMCA M 143)
- ◆ 1998 Rio de Janeiro (IMCA M 148)
- ◆ 1999 Paris (IMCA M 153)
- ◆ 2000 Noordwijk (IMCA M 158)
- ◆ 2001 Stavanger (IMCA M 164)
- ◆ 2002 Aberdeen (IMCA M 168)
- ◆ 2003 Houston (IMCA M 172)
- ◆ 2004 Singapore (IMCA M 176)

In 2005, the event moves to Abu Dhabi and will take place on 22-23 November at the Beach Rotana Hotel & Towers.

Full details are available at www.imca-int.com/events

Other IMCA Guidance on Dynamic Positioning

IMCA C 002	<i>Competence Assurance & Assessment: Guidance and Competence Tables: Marine Division</i>	IMCA M 137	<i>General thruster specification and bid information questionnaire</i>
IMCA D 010	<i>Diving operations from vessels operating in DP mode</i>	IMCA M 138	<i>Microbiological contamination of fuel oil IMCA questionnaire results</i>
IMCA D 035	<i>Selection of vessels of opportunity for diving operations</i>	IMCA M 139	<i>Standard report for DP vessels annual trials</i>
100 DOE	<i>Dynamic positioning systems' incidents – plus annual updates: 102, 104, 110 and 120 DPVOA, IMCA M 130, 135, 144, 152, 157, 165, 169, 173, 177</i>	IMCA M 140	<i>Specification for DP Capability Plots</i>
101 DPVOA	<i>Examples of a DP vessel's annual trials programme</i>	IMCA M 141	<i>The use of DGPS as a position reference in DP control systems</i>
IMCA M 103	<i>Guidelines for the design and operation of DP vessels</i>	IMCA M 142	<i>Position reference reliability study</i>
105 DPVOA	<i>Failure modes of the Artemis position reference system</i>	IMCA M 145	<i>Review of three dual hydro acoustic position reference systems for deepwater drilling</i>
108 DPVOA	<i>Power system protection for DP vessels</i>	IMCA M 146	<i>The possibilities of GLONASS as a DP position reference</i>
IMCA M 109	<i>A guide to DP-related documentation for DP vessels</i>	IMCA M 147	<i>Station keeping incidents reported for 1997</i>
112 UKOOA	<i>UKOOA publications of joint initiatives</i>	IMCA M 150	<i>Quantified frequency of shuttle tanker collision during offtake operations</i>
113 IMO	<i>Guidelines for vessels with dynamic positioning systems</i>	IMCA M 151	<i>The basic principles and use of hydroacoustic position reference systems in the offshore environment</i>
115 DPVOA	<i>Risk analysis of collision of DP support vessels with offshore installations</i>	IMCA M 154	<i>Power management system study</i>
IMCA M 117	<i>The training and experience of key DP personnel</i>	IMCA M 155	<i>DGPS Network Provision and Operational Performance – A world-wide comparative study</i>
118 DPVOA	<i>Failure modes of Artemis Mk IV position referencing system</i>	IMCA M 156	<i>Dynamic positioning incidents 1990-99: The IMCA Database</i>
IMCA M 119	<i>Fires in machinery spaces on DP vessels</i>	IMCA M 159	<i>Thruster-assisted station keeping by FPSOs and similar turret-moored vessels</i>
121 DPVOA	<i>DP position loss risks in shallow water</i>	IMCA M 160	<i>Reliability of position reference systems for deepwater drilling</i>
122 DPVOA	<i>Differential GPS reliability study</i>	IMCA M 161	<i>Two-vessel operations: A supplement to IMCA M 103</i>
IMCA M 125	<i>Safety interface document for a DP vessel working near an offshore platform</i>	IMCA M 162	<i>Failure modes of variable speed thrusters</i>
126 DPVOA	<i>Reliability of electrical systems on DP vessels</i>	IMCA M 163	<i>The quality assurance and quality control of software</i>
127 DPVOA	<i>The issue of a flag state verification acceptance document</i>	IMCA M 166	<i>Guidance on Failure Modes & Effects Analyses (FMEAs)</i>
128 DPVOA	<i>QRA for the use of a dual DGPS system for DP</i>	IMCA M 170	<i>A review of marine laser positioning systems</i>
IMCA M 129	<i>Failure modes of CPP thrusters</i>	IMCA M 171	<i>Crane specification document</i>
IMCA M 131	<i>Review of the use of the fan beam laser system for DP</i>	IMCA M 174	<i>A review of the Artemis Mk V positioning system</i>
IMCA M 134	<i>A comparison of moored and DP diving support vessels</i>	IMCA M 175	<i>Operational communications: Part 1: Bridge & dive control</i>
		IMCA M 178	<i>FMEA management guide</i>