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# DP POSITION REFERENCE SYSTEMS AND SENSORS

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## CHAPTER 1 INTRODUCTION TO POSITION REFERENCES & SENSORS

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DIFFERENT PRINCIPLES INCLUDING RELATIVE AND ABSOLUTE AND GENERAL CHALLENGES EG, BLOCKING OF SIGNALS

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The function of a DP systems is to hold the vessel in a designated position and or on a designated heading. It does this using the vessels power and thrust to counteract the environmental forces of wind tide and current.

For the DP systems and the DPO to know that the vessel is in the correct position, the use of the most accurate and most reliable position reference systems is critical.

IMO 1580 3.4.3 Position reference systems says

.5 The position reference systems should produce data with adequate accuracy and repeatability for the intended DP operation.

IMO MSC 1580 uses the word REPEATABILITY. It means that the position reference system WILL accurately REPEAT the vessel's position over and over again; we would say, is the position reference system RELIABLE.

There are many different position reference systems for the DPO to choose from when setting up on DP mode. But beware because they are not all suitable or safe for every DP operations.

IMO 1580 3.4.3 Position reference systems tells us that

.1 Position reference systems should be selected with due consideration to operational requirements, both with regard to restrictions caused by the manner of deployment and expected performance in working situations.

So, which and how many position reference system to select ?

The number of position refence systems that need to be selected by the DPO is defined by the equipment class of the DP vessel in question,

.2 For equipment class 1, at least two independent position reference systems should be installed and simultaneously available to the DP control system during operation.

.3 For equipment classes 2 and 3, at least three independent position reference systems should be installed and simultaneously available to the DP control. system during operation.

That's how many but now which ones to select?

MTS DP TECHNICAL COMMITTEE DP GUIDANCE PART 1 lists types of PRS under the heading of **Absolute and relative**

An absolute system gives vessel geographical position. A relative system gives vessel position in relation to a fixed reference.

|  <b>Absolute</b> | <b>Relative</b>          |
|---|--------------------------|
| DGNSS (DGPS and GLONASS)  | Laser (Fanbeam, Cyscan)  |
| Acoustic (USBL, SBL, LBL)   | Radar (RADius, RadaScan) |
| Taut Wire   | DARPS                    |

It is VERY VERY important to remember that:

.4 When two or more position reference systems are required, they should not all be of the same type, but based on different principles and suitable for the operating conditions.

This is so the vessel's DP system does not experience COMMON MODE Failure Syndrome. For example, if a vessel was using two independent DGPS and a laser system an inexperienced DPO might think this arrangement complied with the requirements for equipment class 2 or 3 vessels,

BUT the same root cause could effect BOTH DGPS's (sun sports for example) resulting in both systems suffering a drift problem. The DP system's voting technology may then reject the laser PRS, in fact the only reliable system, and the vessel will drift off station.

And don't forget that if you are on an equipment class 3 vessel you should check your DP operations manual or FMEA to make sure that at least one of the position reference systems IS connected directly to the backup control system and separated by an A-60 class division from the other position reference systems.

Double and triple checking is essential so that the right PRS are selected for each DP operation.

### **IMCA 103 GUIDELINES FOR THE DESIGN AND OPERATION OF DYNAMICALLY POSITIONED VESSELS**

#### **3.4.6 DP Location Set-up Checklist**

The purpose of these checks is to ensure that the vessel's station keeping performance at the working location is satisfactory and, **in particular, to ensure that the position reference systems are properly set up.**

Every deck officer knows that no PRS is completely accurate all of the time so CONSTANT VIGILANCE is needed when operating in DP.

#### IMO 1580 3.4.3 Position reference systems

.6 The performance of position reference systems should be monitored warnings should be provided when the signals from the position reference systems are either incorrect or substantially degraded.

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## SUMMARY VIDEO

Now watch the summary video