

A New UK Loran Transmitter: Procurement, Installation and Service Provision

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Introduction

For a long time now those in the know have been worried about having to rely upon the Global Navigation Satellite System (GNSS) as a single source of Position Navigation and Timing, particularly where there is an impact to safety-of-life. In Europe the general consensus is that the maritime environment will become more crowded. An increase in trade will bring an increase in ship movements; with faster, larger vessels; greater affluence will increase the number of leisure craft; and developments in renewable energy will bring about more offshore wind, wave and tidal farms. Against this backdrop then a complement and backup to GNSS isn't a luxury, it is a necessity.

The UK and the GLAs

The UK has always been interested in Loran, having been observers of NELS for many years, and having had a good deal of involvement with the ILA.

In the maritime sector, the General Lighthouse Authorities (GLAs) of the UK and Ireland first expressed their concerns about over reliance on GNSS in "2020 – The Vision", a document published in 2005 [1]. More recently the publication of the GLAs' Radionavigation Plan [2] has further expressed these concerns. These documents outline the strategy and plans for the GLAs up to 2020 and call for the further investigation of Loran as a complement and backup to GNSS in terms of its performance, coverage, cost-effectiveness and user acceptance.

The UK Department for Transport backed the GLAs' investigations by approving their use of resources to install a Loran transmitter at the British Telecom Radio Station near Rugby, England in July 2005. The station acted as a focal point in the UK and allowed the GLAs the opportunity to discuss eLoran from a safety, security and economic perspective. Eventually 'The Case for eLoran' document [3] was produced together with an initial business case.

Trials and Objectives

The station also allowed the GLAs to perform several very successful proof of concept trials. The highlights being a demonstration of sub 10m accuracy in and around Harwich Harbour, and showing that Loran's timing performance can meet the highly demanding requirements of the communications industry.

The success of the Rugby station prompted the GLAs to further develop their eLoran strategy and work programme. And where Rugby was very much an opportunistic project consisting as it did of a well-established radio station site, a spare transmitter, spare masts with a hastily erected T-antenna – the replacement station at Anthorn is being planned with a much more focused set of objectives:

- Extend the Loran transmission trials to March 2010 and beyond
- Continue an ongoing e-Loran programme of work and publish the results
- Encourage the development of eLoran expertise both within the GLAs and more broadly
- Work with international partners to ensure that Loran remains operational and transition plans to eLoran are prepared globally
- Work to identify appropriate long-term institutional arrangements for eLoran in Europe
- Be involved in the development of eLoran standards
- Work to secure long-term funding for eLoran services in Europe
- Encourage the development of user equipment
- Encourage and support the realisation of the European Radio Navigation Plan
- Work with IALA and IMO to ensure that the ERNP is harmonised
- Continue to seek wider support from other user segments and public sector domains to share future costs on an equitable basis
- Work with European colleagues to design and implement an eLoran system for Europe

With these objectives then, the GLAs overall goal is to follow up on the 'The Case for eLoran' to:

'...ensure the provision of an international, globally-standardised eLORAN position, navigation and timing, multi-modal service, based upon interoperable multi-regional components both as a complement to GNSS and as a stand-alone backup in case of failure, by 2012.'

But before this mammoth task could begin one small issue had to be resolved.

Procuring the Future

In October 2006 it was recognized, by the Chief Executives of the GLAs, that a new Loran service would need to be procured through a *restrictive competitive procurement* process. This would have to happen before the end of the Rugby contract on 31st March this year.

Lest we fall foul of European Union procurement law, a Contract Notice in the Official Journal of the European Union was published in late in November 2006. This was an advert requesting formal expressions of interest from potential tenderers.

During this initial period the GLAs also set up a *Procurement Steering Committee*. The committee consisted of the director of Research and Radionavigation Sally Basker, the Chairman of the Inter GLA Committee on Radionavigation Captain Duncan Glass, a representative of Trinity House's Legal and Risk department Ms. Leanne Clarke and representatives of the UK's Department for Transport, David Knight and Phil Carey.

It was the DfT's suggestion that a 15-year service be procured. This would ensure to a good basis for competition help provide stability and encouragement for further development of eLoran in the UK **and** in Europe. There would also be a break point at 2010, where a decision will be made about whether to continue the service or not.

Procurement Organisation

Supporting the Steering Committee were a technical sub-committee and a commercial sub-committee. The technical sub-committee contributed to the preparation of the Statement of Work for the Invitation to Tender and would perform the evaluation of the technical part of the tenderers' responses. The commercial sub-committee contributed to the preparation of the commercial procurement documents and would perform the evaluation of the commercial side of the tender responses.

Both sub-committees consisted of technical, financial and legal representatives from all three GLAs; Trinity House, The Commissioners of Irish Lights and the Northern Lighthouse Board. Helios Technology Ltd., a consultancy firm, were contracted to provide procurement support and draft the formal Invitation to Tender package.

The job of the sub-committees was to review and comment on the ITT pack of materials, support the tender evaluation process and provide *ad hoc* support to the eventual contract negotiation process.

Statement of Work

One of the first jobs of the Technical Sub-committee was to produce the Statement of Work. Any potential contractor would have to develop the Loran station infrastructure,

including buildings, masts, communication links, integration into the European Network of stations, and the addition of Eurofix. All of this would have to take place in a very short time indeed, to minimize the off-air time of the UK's transmission.

The station would need to be run according to a strict set of performance requirements for availability and continuity and the service would need to be widely promoted to help develop a user base.

For service provision a 15-year eLoran service running from 2007 to 2022 would be procured. The service would operate in two phases. In Phase 1 the borrowed French transmitter would be used until 2010. Phase 2 will begin when a new transmitter is procured, to be installed from 2010 onwards.

Procurement Process

The complete procurement process started with the initial advert in the European Journal late November 2006. A standstill period of 40 days or so was designed into the process to give enough time for expressions of interest to be raised, and during that time the Invitation To Tender package was put together. The package consisted of the Invitation To Tender document, copies of the International Loran Association's 'eLoran Definition Document' [4], Eurofix technical information, the 'GLA Draft Radio Navigation Plan' and 'The Case for eLoran' document.

The tender was issued early in January, with an initial closing date of 2 April, subsequently extended to 27 April. On the closure date the tenderers sent their proposals to Trinity House Harwich. Eight copies of these documents were made. The originals and copies were then sent to Trinity House at Tower Hill in London on Monday 30 April.

On 1 May the tender evaluation process began with the technical and commercial sub-committees working at Trinity House's headquarters at Tower Hill, London.

Award Criteria

The tenders were evaluated by scoring them against a number of award criteria, with each one given a weighting. Technical, programmatic, financial and contractual aspects were investigated as well as assessing the capabilities of the team.

So this was a very thorough, analytical but nonetheless quick process, at the end of which VT Communications were selected as the preferred tenderer. Again to keep inline with European procurement law we had a standstill period to allow the unsuccessful tenderers to raise questions and make any appeal.

The contract with VT was signed on 31 May 2007 at the European Navigation Conference in Geneva, and the signal came on air on a test GRI 8940 on 28 September, before the 1st October deadline that had been set.

That amounts to a total of 11 months from decision to procure to the signal being on air, so beginning Phase 1 of the two phase approach.

Transition to Phase 2

To move on to Phase 2, beyond 2010, some conditions must be met. Firstly positive results need to be obtained from Phase 1, which includes all the work that the GLAs need to do over the next few years – the GLA's objectives. All of the important results will need to be available by March 2009, since that is when the procurement process for the replacement transmitter would need to start.

Loran in Europe will need to continue, with the UK becoming party to a European Agreement. The technical capability to integrate a new transmitter into the European network will also be required.

Loran Station Anthorn Status

VT have designed and built a new containerised transmission facility using the transmitter originally used at Rugby. The station is housed in three 40-foot long High Cube containers, which have been assembled together using a weatherproof seal. The walls of the structure are insulated to a depth of 90mm, and clad with melamine board. The flooring consists of 12mm thick steel sheeting. The station is fully air-conditioned and the roof is painted silver to maintain a comfortable internal daytime temperature. The station is also orientated lengthwise in a north-south direction, again to minimize the effects of sunlight on station heating.

The station generates over 200kW of Effective Radiated Power via a specially constructed T-antenna, which is suspended between a pair of already existing 190m tall masts. The transmitter will be statically and dynamically calibrated in the coming weeks and will be integrated into the European network of stations by 1 December 2007 within GRI 6731, operating as station 6731Y with the final Emission Delay to be determined following dynamic calibration.

Summary and Conclusions

The UK now begins a new era of Loran signal provision. The aim is to provide a stable and reliable service for the next 15 years. This will allow much more extensive technical trials and the further development of eLoran in the UK and Europe. The UK General Lighthouse Authorities are proud to be at the forefront of this endeavor.

References

[1] '2020-The Vision – Marine Aids to Navigation Strategy', *General Lighthouse Authorities – The United Kingdom and Ireland*, 2005

[2] 'GLA Radio Navigation Plan', *General Lighthouse Authorities – The United Kingdom and Ireland*, February 2007

[3] 'The Case for eLoran', *The General Lighthouse Authorities Research and Radionavigation Directorate*, 8 May 2006.

[4] 'Enhanced Loran (eLoran) Definition Document', Version 1.0, *International Loran Association*, January 2007

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