



## PRESS RELEASE

# UK-US joint venture heralds new dawn for Loran

*“Taviga”, challenging the threat of Global Navigation Satellite Systems’ (GNSS) susceptibility to interference and jamming*

**Lydbrook, Gloucestershire, UK, 3<sup>rd</sup> December 2015**, the founders of Chronos and UrsaNav have formed a new collaboration, known as “Taviga”, to enhance the resilience and reliability of the many economic and business models that depend on space-based timing and positioning services. As good as space-based services are, they are known to have a susceptibility to interference and jamming.

*Taviga* is the concatenation of parts of the words for *Timing* and *Navigation*. The company is focused on the provision of Assured Timing and Navigation to secure our critical infrastructure from cyber and other threats, thereby addressing the growing concern that overdependence on single systems for positioning, navigation, and timing (PNT) makes us vulnerable. *Taviga* combines the founders’ decades of experience specializing in Low Frequency (LF) PNT technology and industrial timing applications at national and international levels. Its objective is to provide a commercially operated assured LF PNT service.

Charles Curry, founder of Chronos Technology Ltd in the UK, and Charles Schue, founder of UrsaNav, Inc. in the USA, have joined forces to launch *Taviga Ltd* and *Taviga, LLC*. *Taviga* will focus on preserving and establishing LF PNT networks the UK, Europe and the USA using repurposed Loran-C or purpose-built eLoran technology. *Taviga* anticipates working in partnership with Government Agencies and other entities who have a vested interest in reducing the vulnerability and improving the resilience of critical national infrastructure with a dependency on the Global Positioning System (GPS) and other Global Navigation Satellite Systems (GNSS) sources of PNT.

Charles Curry said: “We have been researching the precise timing capability of eLoran transmissions for over 10 years. During that time, the system has never failed and most impressively it has

continued to deliver sub-microsecond time accuracy traceable to UTC in some very challenging locations including deep inside buildings. Our research programme was supported by the UK's Innovation Agency – Innovate UK through two flagship projects GAARDIAN and SENTINEL. These two projects highlighted the vulnerabilities that threaten GPS signals (and in the future, Galileo) such as jamming, interference and spoofing. They also demonstrated how eLoran is a technically dissimilar source of PNT and not vulnerable to the same types of interference. eLoran is a truly complementary source of PNT ideal for use in critical infrastructure applications that demand precise time and timing such as Telecoms, Broadcasting, Financial Services and Power Utilities.

Charles Schue said: “Every government, academic, and industrial study has resulted in the selection of the LF technology known as Enhanced Loran, or eLoran, as the best wide-area complement to GNSS. There is no doubt that the combination of GNSS and eLoran provides the PNT resilience that most users require. Whether the application is timing/frequency, aviation, maritime, land-mobile, or location based, integrated GNSS-eLoran solutions can provide the proof-of-time and proof-of-position necessary to safeguard national infrastructure and for business continuity of operations. Additionally, adding eLoran into the PNT mix enables or enhances the capabilities of regional and purpose-built solutions. PNT resilience results from an eco-system made up of layered solutions. Overreliance on a single solution is neither prudent nor safe. It's time for *Taviga*.”

Tests have been conducted as part of Innovate UK supported research projects GAARDIAN and SENTINEL, which were led by Chronos Technology Ltd and included UrsaNav's eLoran receiver engine. eLoran transmissions from the UK, Denmark, Germany, France, and Norway, have consistently demonstrated **positioning accuracies** of better than ten meters and **timing accuracies** of less than 100ns in the area of differential eLoran reference sites. *Taviga* will now seek to engage those governments, and others, in discussions as to how to transition their Loran stations to commercial operation.

*Taviga's* goal is the long-term operation of an eLoran system for at least ten years. This length of time provides the necessary service assurance continuity to enable industrial users to invest with confidence in an eLoran-based timing and navigation service that complements their GNSS solutions. As users become accustomed to the additional capabilities and resilience provided with a combined GNSS-eLoran solution, *Taviga* expects to expand the service footprint into other countries worldwide.



### **About Taviga**

Taviga Ltd and Taviga LLC are affiliated companies, both initially co-owned by Charles Curry and Charles Schue. Taviga Ltd ([www.taviga.co.uk](http://www.taviga.co.uk) or [www.taviga.eu](http://www.taviga.eu)) will operate with an initial focus on the UK and European markets. Taviga LLC ([www.taviga.com](http://www.taviga.com)) will operate with an initial focus on North American markets.

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### **About Chronos Technology Ltd**

Founded by Professor Charles Curry in 1986, Chronos provides time, timing, phase and distribution systems for industrial networks including the communications, energy and finance markets. Chronos also specialises in components and systems for industrial resilient navigation and timing solutions including global satellite systems (GNSS), eLoran transmissions and GNSS jamming detection. For additional information, visit our websites at [www.chronos.co.uk](http://www.chronos.co.uk) or [www.gps-world.biz](http://www.gps-world.biz).



### **About UrsaNav, Inc.**

UrsaNav, Inc. is the global leader in the provision of LF PNT solutions, whether it be Loran-C or eLoran technology, equipment, and services. Founded in 2004 by Charles Schue, UrsaNav's personnel have been involved in every technical advance in Loran-C and eLoran technology since the early 1970s, resulting in deep experience in the design, development, and deployment of terrestrial PNT systems. For more information, visit our website at [www.ursanav.com](http://www.ursanav.com).