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所属 (Domain) 情報科学領域 (Domain of Computer and Information Sciences)

・ 博士後期課程社会インフラシステム科学専攻 (Major in Society's Infrastructure Systems Science)

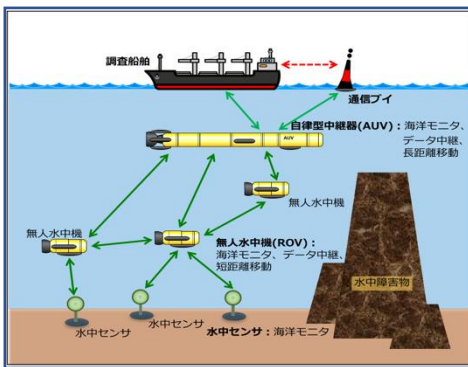
● 研究テーマ (Research theme)

- ① 照明機能制御を有した照明可視光通信の研究
(Lighting constrained Visible Light Communications)
- ② 水中可視光通信ネットワークシステムの研究
(Underwater Visible Light Communications)

① 携帯電話やWi-Fiなどに使用される無線周波数資源枯渇問題の解決策の一つとして、本研究室では新しい周波数資源である“光”に着目しています。とくに、人間の目に見える光（可視光帯域）を用いた無線通信は、照明用のLEDを送信機として用いることで照明用の電力をそのまま無線通信に使用できるというメリットがあります。本研究室ではこの可視光通信において、高速通信と高度な照明機能を同時に実現する照明可視光通信の研究を行っています。There is a growing need to exploit the unlicensed spectrum with new technologies in order to reduce the spectral load on radio frequency (RF) mobile systems. In particular, the visible light spectrum is attracted attention for visible light communication (VLC). VLC can be directed and can be sequestered by walls, which allows the coexistence of RF transceivers. Generally, VLC controls the intensity of visible light to convey information. Since the perception of the light blinks, light brightness, and light color by human eye depends on the optical transmission signal, VLC is capable of simultaneously achieving both data transmission and universal illumination with indoor light-emitting diode (LED)-based lighting fixtures. In our laboratory, we are now working on several projects on the lighting constrained VLC.



② この可視光帯域は海中でも低減衰で伝搬可能であり、海中での高速無線通信手段として海中可視光通信が注目されています。本研究室ではこの海中可視光通信を用いた海中無線ネットワーク網構築のための研究を行っています。In recent years, a high-speed underwater wireless network with unmanned underwater vehicle (UUV) has been proposed to facilitate the search and excavation work of undersea international resources. The UUV dives and collects information surveyed by each underwater sensor which is always placed bottom of the ocean. Compared with underwater acoustic communication, VLC provides a much higher bandwidth and lower cost, which is more suitable to realize high speed underwater communication.



In our laboratory, we are investigating the optimum modulation/demodulation, multiple access technique, and so on. In addition, due to achieve both wireless communication and battery charge functions of underwater sensors for the more flexible cellular underwater wireless network, we also focus on visible light simultaneous wireless information and power transfer (VL-SWIPT) system.

キーワード (Keyword)

光無線通信 (Optical Wireless Communication)、可視光通信 (Visible Light Communication)

専門分野 (Specialized Field)

デジタル変復調、無線/光無線通信システム (Digital Communications, wireless communication systems, and optical wireless communication systems)

共同研究可能技術 (Possible Technology of Cooperative research)

可視光通信、水中可視光通信 (VLC, Underwater VLC)

関連論文・特許情報 website

<https://info.ibaraki.ac.jp/Profiles/102/0010182/profile.html>

(Related articles・patent information)

研究設備 (Research Facility)

ワークステーション (Work Station) VLC実験設備 (Experimental equipment for VLC)

研究室URL (Lab. URL)

https://info.ibaraki.ac.jp/Profiles/102/0010182/prof_e.html

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