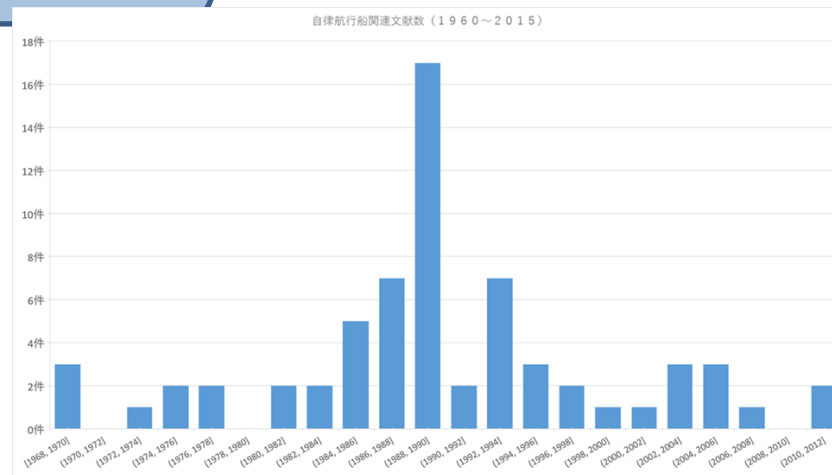


Cutting Edge, 50 years ago



Kinkasan Maru delivered in 1961

- Kinkasan Maru : World first Bridge control system of Main Engine and Centralized Monitoring and Control system in Engine room
- Followed by Highly reliable intelligent ship (高信頼度知能化船) and Expert system, but faded away after around 2000

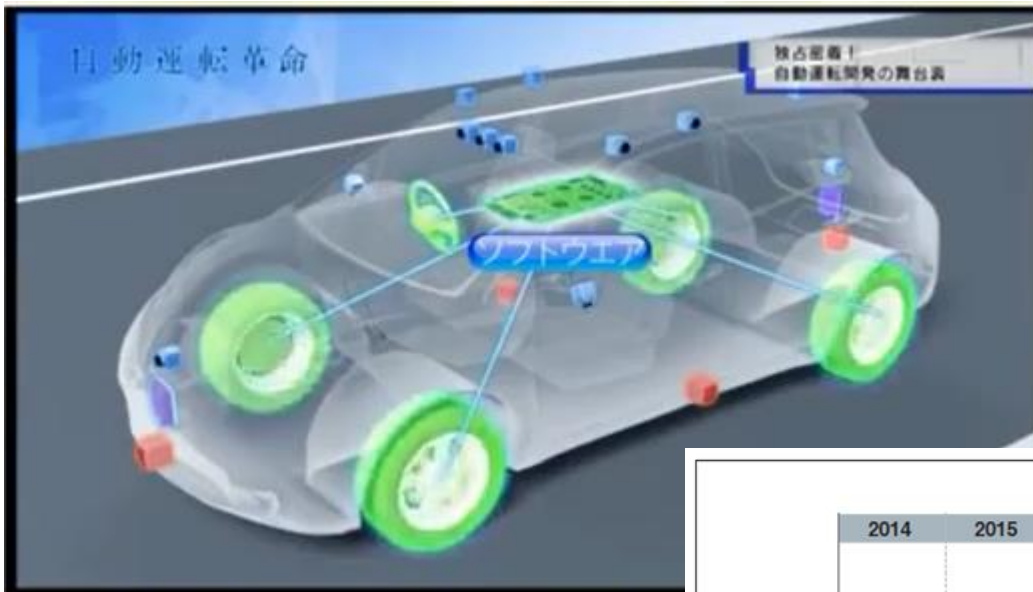


No. of papers on Automated vessels in Japan, faded away after around 2000

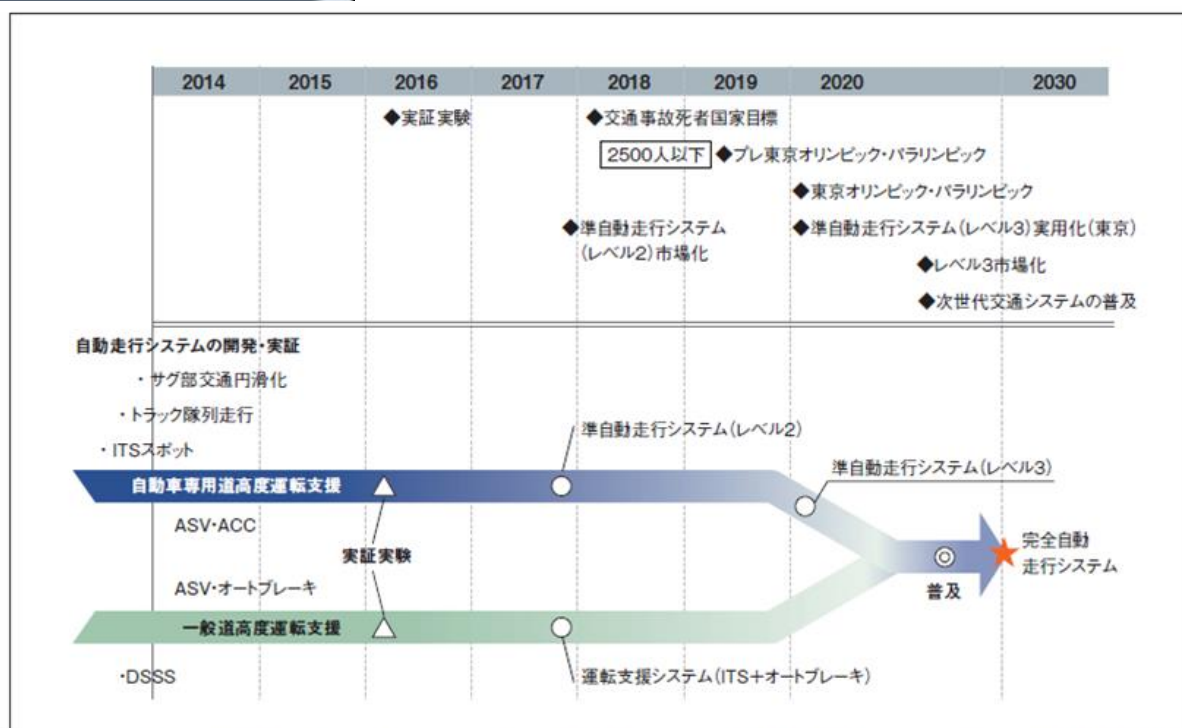
Maritime Innovation Japan (MIJAC) Technical Advisor 並川俊一郎

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Road Map of Japan Unmanned by 2030



(出所：内閣府政策統括官(科学技術・イノベーション担当)「SIP(戦略的イノベーション創造プログラム)自動走行システム研究開発計画」2015年5月21日) 「自動運転の未来 2016-2020」(日経BP社)

NHK TV: Revolution on Autonomous driving

Element technology

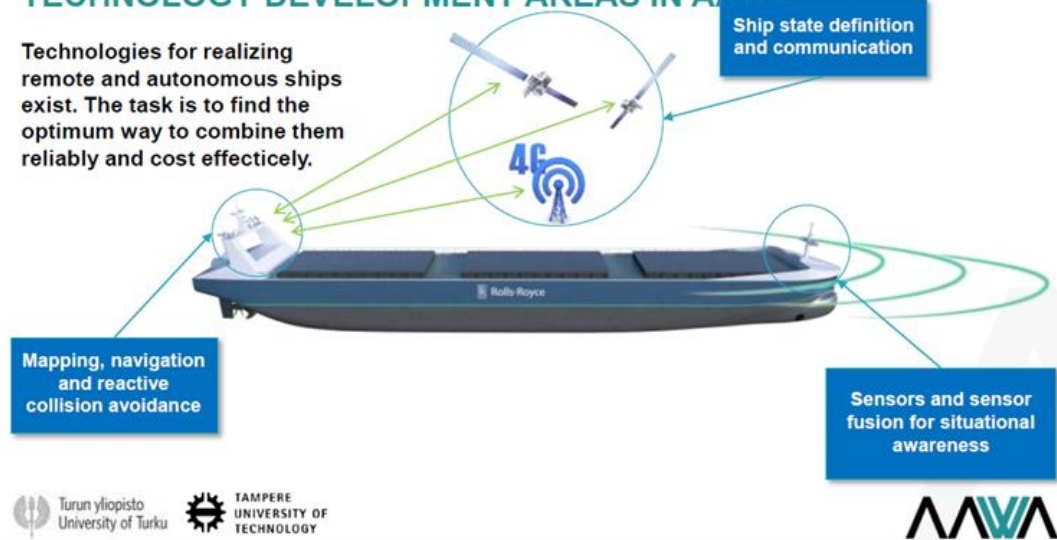
- Cognition (milliwave radar, LIDAR, Camera, Sensors mounted on cars, 3D Map)
- Analysis (Software, AI, Deep Learning, Google’s test run= 70 times around the globe)
- Activation and Operation
- Communication (GPS, Satellite, Car2Car, Road2Car)



- **Rolls Royce:** Remotely operated ship
- **DNV GL REVOLT**
Once concluded in 2015, but initiated Phase II again
- **EU MUNIN project**
Concluded in 2015
- **AAWA**
Funded by the Finnish Government, until 2017 with € 6.6 million budget. Rolls Royce, DNV GL, NAPA, University of Turk etc.
- **Norway: World's 1st test area**
In the Trondheim fjord. The Norwegian Forum for Autonomous Ships (NFAS)

TECHNOLOGY DEVELOPMENT AREAS IN AAWA

Technologies for realizing remote and autonomous ships exist. The task is to find the optimum way to combine them reliably and cost effectively.



Japan stays far behind

Benefit of Unmanned ship – Safety, Environment and Economy

- Prevention of Collision and Grounding
- Eliminate human errors
- Optimum navigation suited for the in-situ sea condition
- Cost reduction of Shipbuilding and Ship operation
- Save man-hours and energy, Environmentally friendliness

Way forward to Unamanned ship

- Various kinds and numbers of sensors, Sensor fusion
- Software development (AI, Deep Learning = huge number of test runs and high performance & compact computer are indispensable) ソフトウェア、AI、深層学習
- Legislation, Insurance, Societal recognition
- Massive and High-speed communication

Japan has just started as well 日本もやっと開始 (先進安全船舶技術研究開発支援事業)

- MLIT has awarded R&D projects for financial assistance in June, 2016
- Collision risk evaluation and autonomous navigation etc. in total 7 projects

In order not to repeat the slack after 2000

- Cooperation among Shipping, Shipbuilding, Manufacturers, AI and Space
- CONTINUITY – Never abandon for the future!! 継続！