



5th Maritime Autonomous Systems
Regulatory Working Group Conference



Tordenskjold's soldiers.....





Google

tordenskjolds soldater Rediger

usual suspects



Aids to Navigation

IALA Constitution Art. 1

“A device, system or service, external to vessels, designed and operated to enhance safe and efficient navigation of individual vessels and/or vessel traffic”





Question

What is IALAs main role(s)/task(s) in the development of MASS?





MASS Workshop

- Future AtoN's
 - AtoN's able to provide information (SMART AtoN's)
 - Migration from physical to digital
 - Shore Infrastructure and support
 - Development of VTS
 - Precise Position system/tracking of ships
 - Organizational Issues
 - Role between IMO and IALA
 - Scoping exercise for IALA's guidance documents
 - More International co-operation
 - Develop recommendation on Cyber Security
-



IALA Strategic Vision and Goals for 2026

Goal 1

Marine Aids to Navigation are **developed** and **harmonized** through international cooperation and the **provision of standards**.

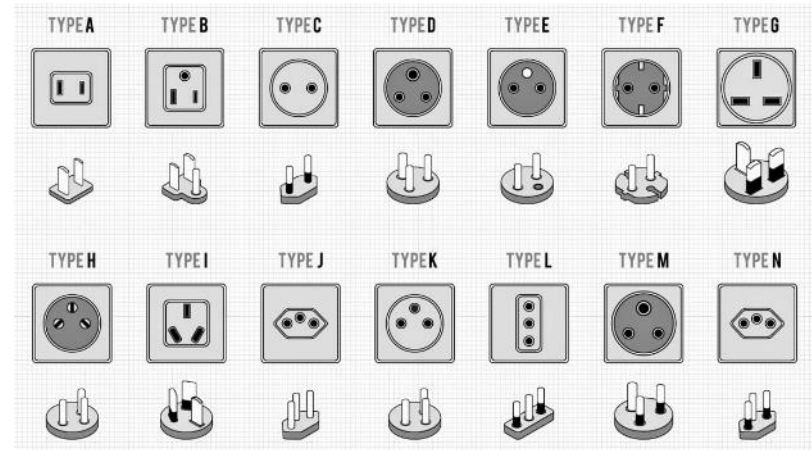
Goal 2

All coastal states have contributed to a sustainable and efficient global network of Marine Aids to Navigation through capacity building and the sharing of expertise.





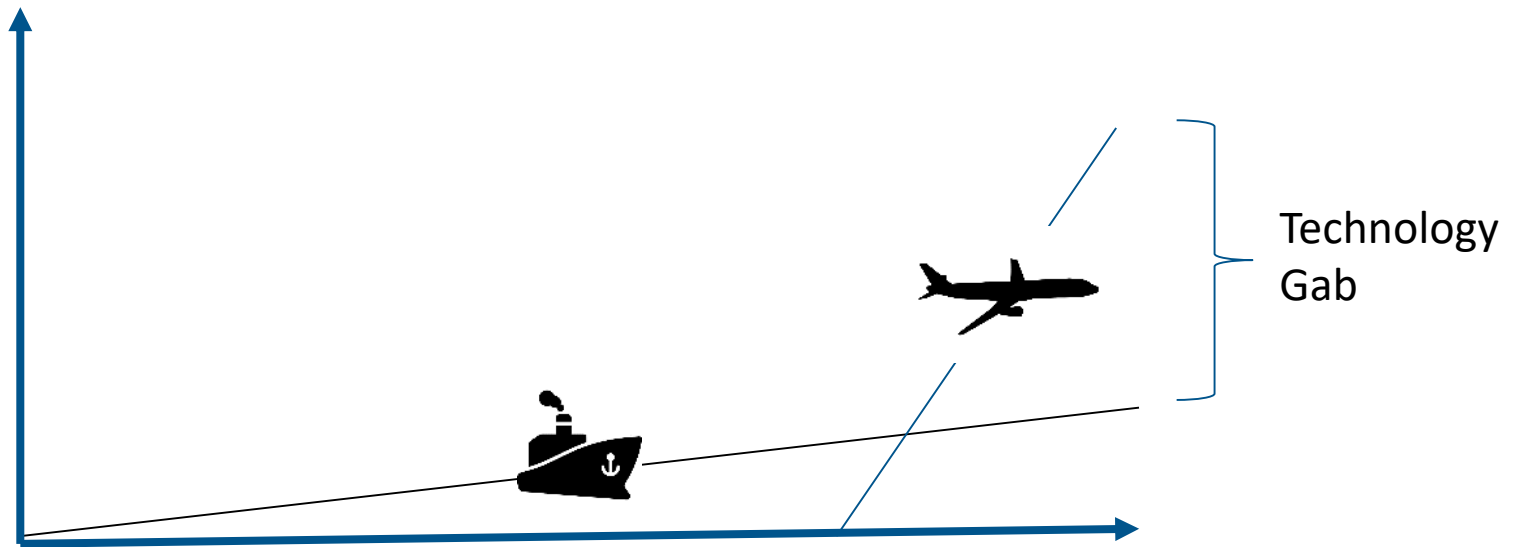
Developed and Harmonized





Mind the Gab

The Maritime domain into the digital age





E-Navigation

The definition (2005-2008)

E-navigation is defined as “the harmonized collection, integration, exchange, presentation and analysis of marine information on board and ashore by electronic means to enhance berth to berth navigation and related services **for safety and security** at sea and protection of the marine environment.”

CHAPTER 2

GENERAL INFORMATION

MARINE CASUALTIES AND INCIDENTS



Damage to port side quarter of the general cargo CELTIC SPIRIT, which dragged its anchor in heavy weather and subsequently collided with two other vessels, also at anchor, causing shell plate damages, on 01/03/2018.

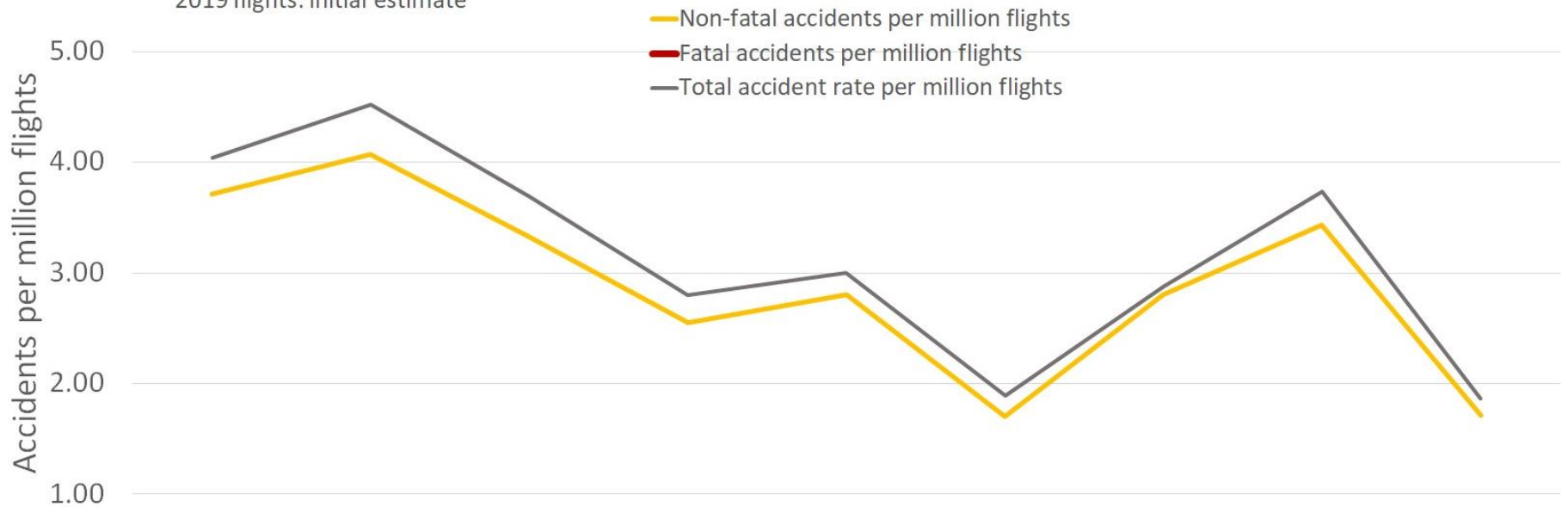
KEY FIGURES 2018

3174	95	53	941	25	3515	188
CASUALTIES & INCIDENTS	VERY SERIOUS CASUALTIES	FATALITIES	PERSONS INJURED	SHIPS LOST	SHIPS INVOLVED	INVESTIGATIONS



2017 was the safest year in aviation history

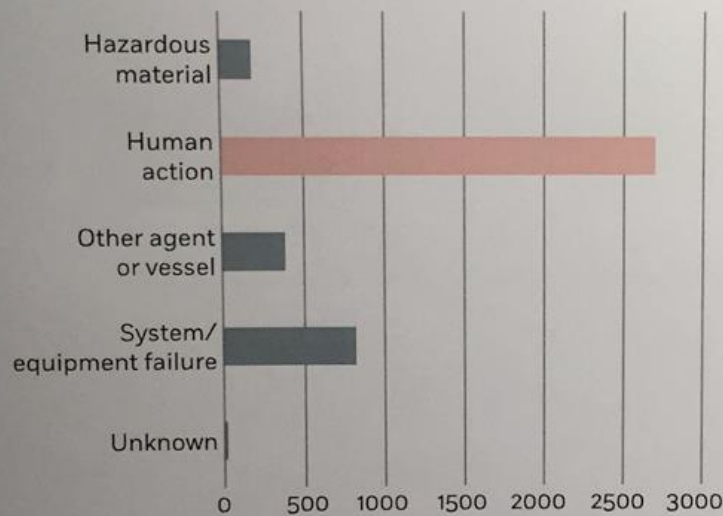
2019 flights: initial estimate



Investigators look for the root causes of the casualty or incident. Such causes are made up of 'accident events' and 'contributing factors'. The reporting scheme used in EMCIP follows this approach. A detailed model of EMCIP can be found in Appendix 2.

2.5.1 ACCIDENT EVENTS

Figure 2.21: Distribution of accident events for 2011 - 2018

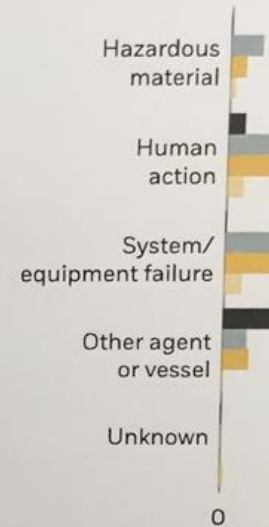


From a total of 4104 accident events analysed during the investigations, 65.8% were attributed to a human actions' category and 20% to system/ equipment failures.

A casualty event can have associated one or more accident events.

Contributing fac
accident event o

**Figure 2.22: Rela
factors for 2011 -**



**Contributing fa
represented the
2003 related to**



The difficult balance

Look out the window

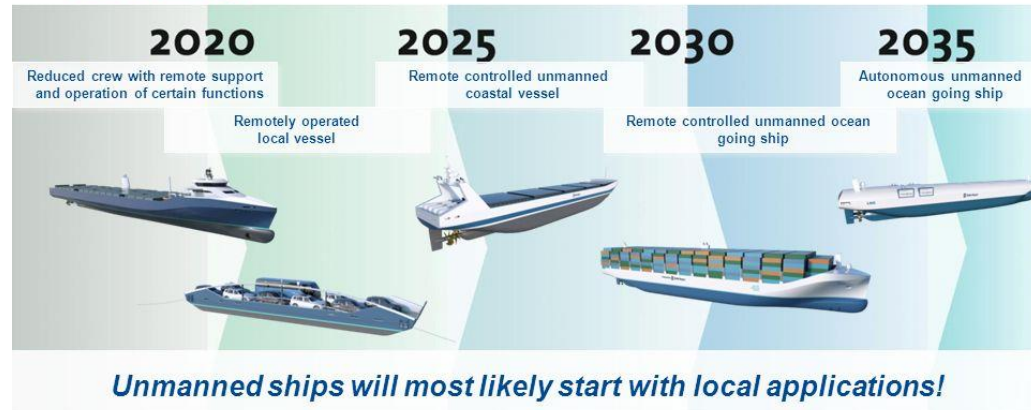


Autonomous navigation





Roadmap



Just around the corner!

© 2015 Rolls-Royce plc Oskar Levander





Maersk CEO: Unmanned Containerships Not in My Lifetime

The ongoing push toward automation ships is not likely to result in a crewless vessel any time soon, according to the CEO of the world's biggest shipping company, Soren Skou.

The latest technological developments have seen the number of crew members on board Maersk Line's ships halved when compared to two decades ago, which has, in turn, helped cut salary costs.

However, Skou doesn't believe giant containerships would be allowed to sail without humans on board, at least not in his lifetime, Bloomberg writes.

"The workforce has now reached a floor and there's no more room to get rid of humans" Skou is cited as saying.

calaméo

THE INTERNATIONAL PILOT

ISSUE NUMBER 44 / JULY 2018

THE JOURNAL OF THE INTERNATIONAL MARITIME PILOTS' ASSOCIATION

A MESSAGE FROM THE PRESIDENT

Fellow Pilots,

As I meet with IMPA members around the world, I am often asked about the much-publicized efforts to develop and introduce so-called "autonomous ships." The IMPA leadership has devoted considerable time and resources to following this subject and participating in debates about it. Pilots, and indeed most other people knowledgeable about ship operations, recognize that much of the expressed enthusiasm is unrealistic and generated by technology vendors and coastal government administrations rather than the ship operating community.

Despite the claims that we hear and read about, there will not be unmanned, remotely navigated, or fully autonomous vessels arriving in pilotage waters in the foreseeable future. Autonomous operations may be introduced in the relatively near term in certain inland waters with small single-purpose vessels, but operations on commercial vessels extend beyond autonomous ships.

We must, however, resist the urge to be dismissive about the development of autonomous ships. Many of its projections may be unrealistic, there is a development ongoing right now that may pose a serious near-term risk to pilotage and global ship operations. This development may have consequences that extend beyond autonomous ships.

What is your opinion about the job shift, which unmanned vessels would bring to shipping industry?

Opinion	Percentage
None	~35%
Positive	~35%
Negative	~30%

SHIP TECHNOLOGY

12 DECEMBER 2016 ANALYSIS

Is 2017 the breakthrough year for unmanned vessels?

By Gary Peters

Autonomy is largely seen as the next big disrupter in the maritime world. So, is 2017 the year in which unmanned vessels really begin to make their presence felt?

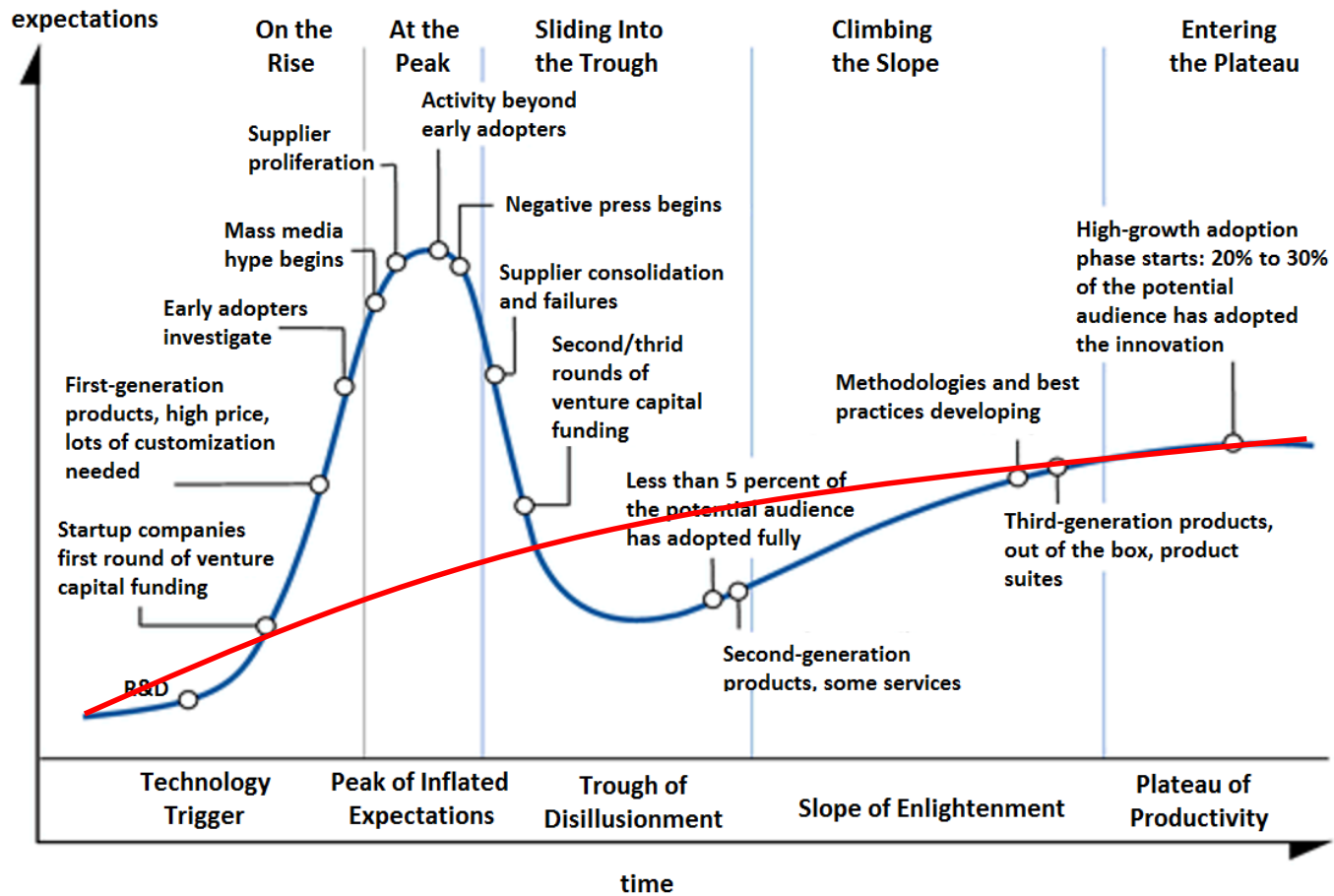
Unmanned ships

MOST READ

About so-called autonomous ships: "Pilots, and indeed most other people knowledgeable about ship operations, recognize that much of the expressed enthusiasm is unrealistic and generated by technology vendors and coastal government administrations rather than the ship operating community"



The hype cycle





The Maritime “future”

- Shore services
- Data Modelling
- Resilient Position, Navigation and Timing (PNT)
- Connectivity





The Maritime Buoyage Agreement

IALA A and IALA B

During the IALA conference in November 1980 two navigation marking systems, i.e. the System A (red color for the left hand side of the ship) and the System B (red color for the right hand side of the ship), were combined into one - the **IALA Maritime Buoyage System**.



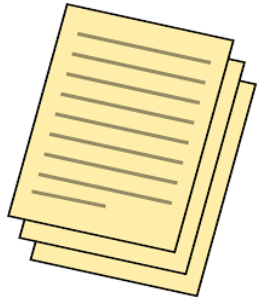


Publications

Main result of the Committees' work

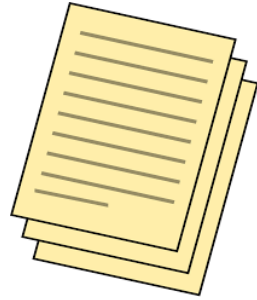
- **Standards** which can be referred to directly in IMO and other international conventions and in national maritime laws.
 - **Recommendations** which advise what should be done.
 - **Guidelines** which advise how to implement the recommendations as 'best practice'.
 - **Manuals** which provide general reference materials (NAVGUIDE; MBS; VTS Guide; IALA Dictionary).
 - **Model courses** which provide guidance on the training of VTS personnel, Aids to Navigation Managers and Aids to Navigation Technicians.
-

Five types of e-Nav “specifications/descriptions”



**Maritime
Service
Descriptions**

IMO



**S-100, S-200 ...
Data Product
Specifications**

**IHO (S-100)
IALA (S-200)**



**Technical
Service
Specification**

IALA



**Technical
Service Design
Description**

IALA



**Technical
Service Instance
Description**

IALA

Basic Principles
Technology Agnostic

What to do
(IALA Recommendations)

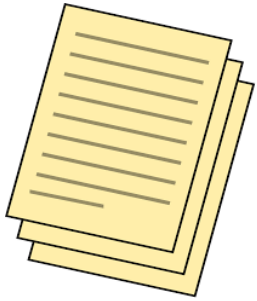


Technology
Selection
How to do...
(IALA Guidelines)
(Blueprint)



Actual
Implementation
(Sea Chart)

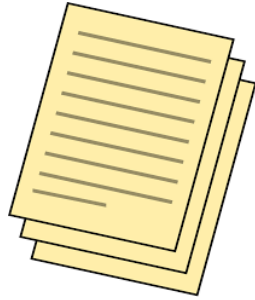
Five types of e-Navigation “specifications”



**Maritime
Service
Descriptions**

IMO

IMO



**S-100, S-200 ...
Data Product
Specifications**

**IHO (S-100)
IALA (S-200)**

**IHO Guidance
and
IALA G1087
IALA G1088
IALA G1106**



**Technical
Service
Specification**

IALA



**Technical
Service Design
Description**

IALA

IALA G1128



**Technical
Service Instance
Description**

IALA



I am Tony

I want to start
my own
business
using e-Navigation
principles



**Maritime
Service
Descriptions**



**S-100, S-200 ...
Data Product
Specifications**



**Technical
Service
Specification**



**Technical
Service Design
Description**



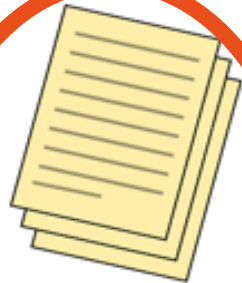
**Technical
Service Instance
Description**



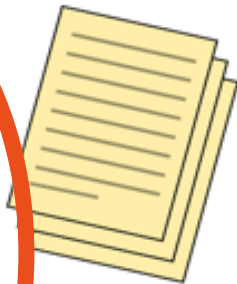
What type of business to select?

- Tug service?
- VTS service?
- AtoN service?

- Pizza service?



**Maritime
Service
Descriptions**



**S-100, S-200 ...
Data Product
Specifications**



**Technical
Service
Specification**



**Technical
Service Design
Description**



**Technical
Service Instance
Description**



What type of product should I offer?

- Pizza Bolognese?
- Pizza Diavolo?

- Pepperoni Pizza
(my mama's recipe)

Ingredients:
One 21 1/2 oz. pack of brownie mix
1/2 cup water
1/2 cup canola oil
1 egg
1 can coconut pecan frosting
1 cup sour cream
Optional topping: 1/2 cup chocolate chips
and 1/2 cup crushed pecans



Maritime
Service
Descriptions



S-100, S-200 ...
Data Product
Specifications



Technical
Service
Specification



Technical
Service **Design**
Description



Technical
Service **Instance**
Description



What is my Pizza service Concept? (technology agnostic)

- Orders by telecommunication
- Delivered to shipside
- Within 17 minutes
- Firmly packaged & still warm



**Maritime
Service
Descriptions**



**S-100, S-200 ...
Data Product
Specifications**



**Technical
Service
Specification**



**Technical
Service Design
Description**



**Technical
Service Instance
Description**



What technology and design? (Blueprint)

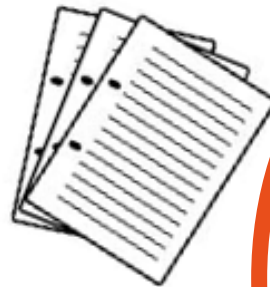
- Stone furnace
- Cardboard packaged
- Delivered by Scooter
- Pay by credit card
- Domino's look alike



**Maritime
Service
Descriptions**



**S-100, S-200 ...
Data Product
Specifications**



**Technical
Service
Specification**



**Technical
Service Design
Description**



**Technical
Service Instance
Description**



I must advertise (Yellow Pages)

- Establish Identity
- Enable discovery
- Publish endpoints
- Conduct business



**Maritime
Service
Descriptions**



**S-100, S-200 ...
Data Product
Specifications**



**Technical
Service
Specification**



**Technical
Service Design
Description**



**Technical
Service Instance
Description**



The Tony is ready for a Pizza Chain or Franchise.



**Maritime
Service
Descriptions**



**S-100, S-200 ...
Data Product
Specifications**



**Technical
Service
Specification**



**Technical
Service Design
Description**



**Technical
Service Instance
Description**