



Australian Government

Australian Maritime Safety Authority

Annex 2

ENAV24-6.1.1.3

Use of Digital Communication Technology in VTS



Overview

- VTS in Australia – a snapshot
- What do we mean by Digital Communication Technology?
- Australian Examples
- Comments / Observations



VTs in Australia - A Snapshot

15 VTs under Australian law:

- 5 VT Authorities
- 9 VT Centres

➤ 2 More in 2019?

VT Authority	Centre	VT
Port of Melbourne Corporation	Melbourne	Melbourne
Pilbara Ports Authority – Dampier	Dampier	Dampier
		Ashburton
Pilbara Ports Authority – Port Hedland	Port Hedland	Port Hedland
Maritime Safety Queensland	Brisbane	Brisbane
	Gladstone	Gladstone
	Hay Point	Hay Point
		Mackay
	Townsville	Abbot Point
		Townsville
	Cairns	REEFVTs
		Cairns
	Sydney	Weipa
		Sydney



VTs in Australia - A Snapshot Annex 2

340,000 km² of waters covered by VTS
under Australian law

Comparable to the combined territorial waters of:

Denmark	Portugal	Sweden	UK	Total
24,700	64,100	85,300	168,100	343,000

Source : Atlas of European Seas and Oceans (2007). Spanish Ministry of Education and Science's Project BSO2002-03576





Looking Forward

- More VTs's
- VTs's expanding their areas
- More coastal VTs's
- Increasing use of VTs beyond Territorial Sea
- Greater data exchange with allied services





Digital Communication?

- Data transmission (also data communication or digital communications) is the transfer of data (a digital bitstream or a digitized analog signal over a point-to-point or point-to-multipoint communication channel.

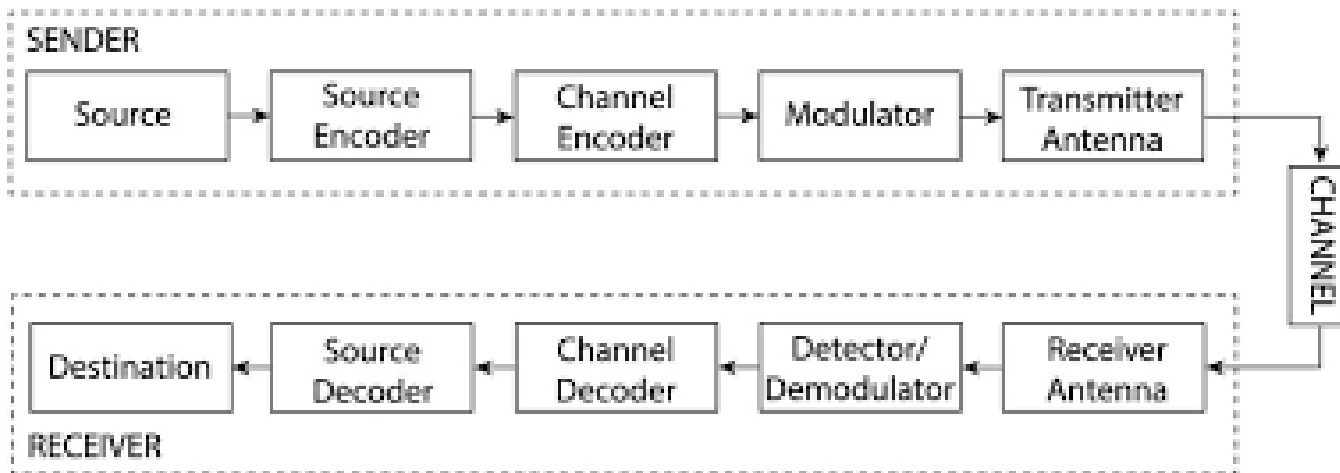
Source – Wikipedia

- Digital communication - electronic transmission of information that has been encoded digitally (as for storage and processing by computers)

Source – The Free Dictionary



Digital Communication?



Are we looking simply at electronic data transfer?



Digital Communication?

- Or are we looking at:
 - Transmission?
 - Handshaking?
 - Validation?
 - Integration?
 - All of the above?





What does Digital Communication offer

Digitised Communications Systems

Advantages:

- Decreasing user cost (economies of scale)
- Fidelity in voice communications using less spectrum (bandwidth)
- Interoperability with other digital systems
- Privacy (encryption)
- Can merge different data (voice, video, files) in the one transmission
- Data compression
- Error correction
- Multiple (and varying) bandwidths
- Enhanced routing

Disadvantages:

- Non-graceful degradation over distance
- Increased deployment to address coverage blackspots

Analogue Communications Systems

Advantages:

- Slower (fidelity) degradation over distance
- Simple transmitter/receiver design
- Very-well understood in the maritime domain

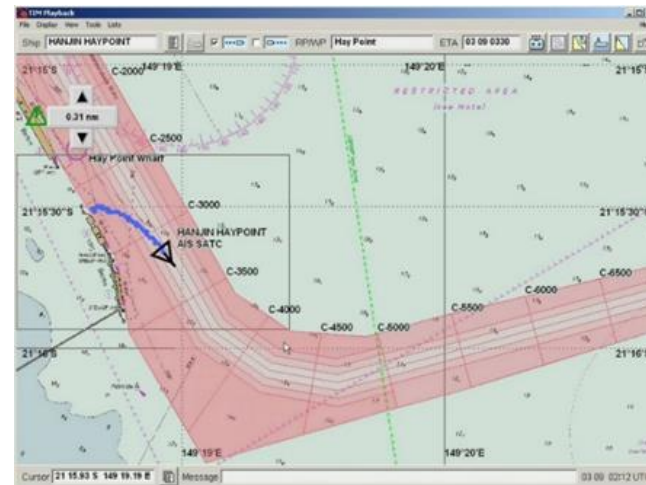
Disadvantages:

- Larger bandwidths (for an equivalent voice channel)
- Limited privacy (lack of encryption)
- Difficult to merge data/voice from different sources



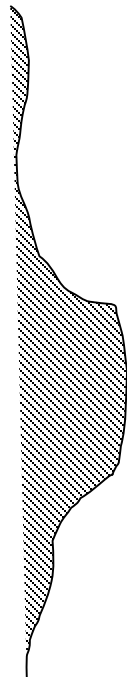
Australian Examples

- Ship Encounter Information
- VTS Exchange
- Route Exchange?

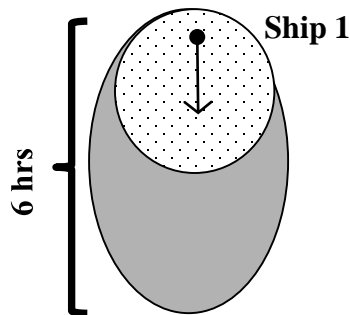




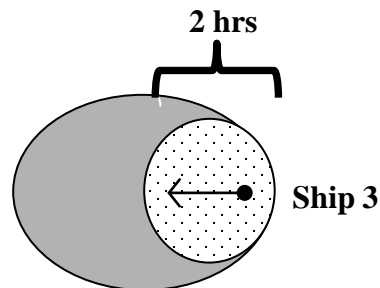
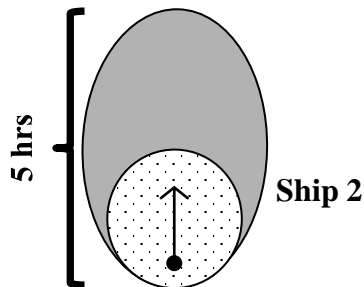
Ship Encounter Information



1. Upon entering the region a vessel is provided with SEI for vessels they will encounter in the first 6 hours



3. After 5 hours if no new traffic has been predicted the vessel will receive updated SEI for the next 6 hours



2. A 2-hour “look-ahead” monitors significant changes to the SEI provided previously, such as a new vessel entering the region or a change in ETA due to an increase or decrease in speed.

4. At any time when requested by the ship



Ship Encounter Information

Some common SEI phrases are:

Pass:	indicates that the ship is stopped
Overtake:	indicates that the ships are heading in roughly the same direction at the position of the predicted encounter
Meet	describes all other situations
(P)	indicates a piloted ship
(NP)	indicates a non-piloted ship
(DD)	indicates a deep draught ship

When a ship enters the REEFVTS Area

Expected SEI (EST):

Meet SILVER ZHANG (P) in your area now

Overtake ENDEAVOUR RIVER (P) at 10 1215

Meet FAR EASTERN SILO (P) at 10 1240

Meet GLORIOUS HALO (P) at 10 1325

Light altered AUSCOAST warning 340 at 10 30 S 142 13 E

New or changed traffic information

Expected SEI (EST):

Meet JAVA SEA (P) at 25 0755

(Changed) pass OOCL ENVOY (P) at 25 0925

(New) meet CHAMPION (NP) at 25 1125



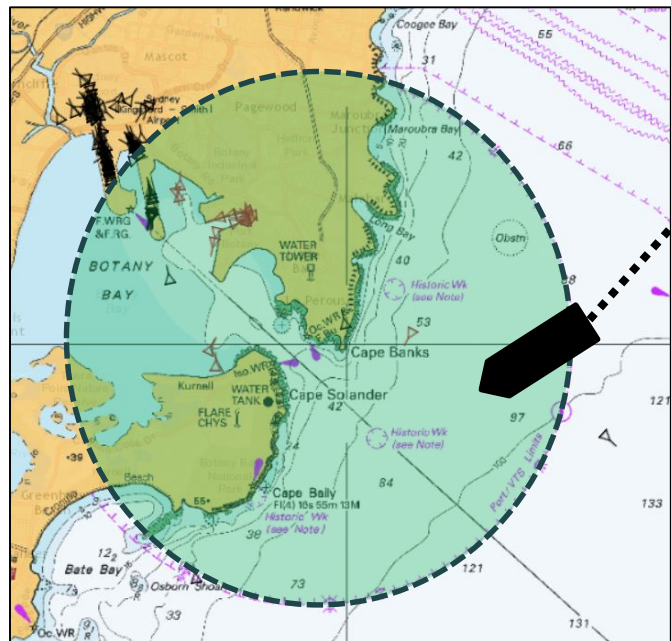
Automated dissemination of information on deficiencies and incidents between VTS Authorities

- Greater situational awareness of individual vessels entering their area and contribute to the safety and efficiency of navigation within their port environment.



Vessel Arrived at Port VTS Area Annex 2

For a vessel arriving in a port VTS area, the system checks if there are any deficiencies and/or reported incidents for that vessel.



AIS position detected inside Port VTS Area

Is the vessel on the port arrival list?

YES

NO

No Further Action

Does the vessel have any outstanding deficiencies and/or reported incidents?

YES

NO

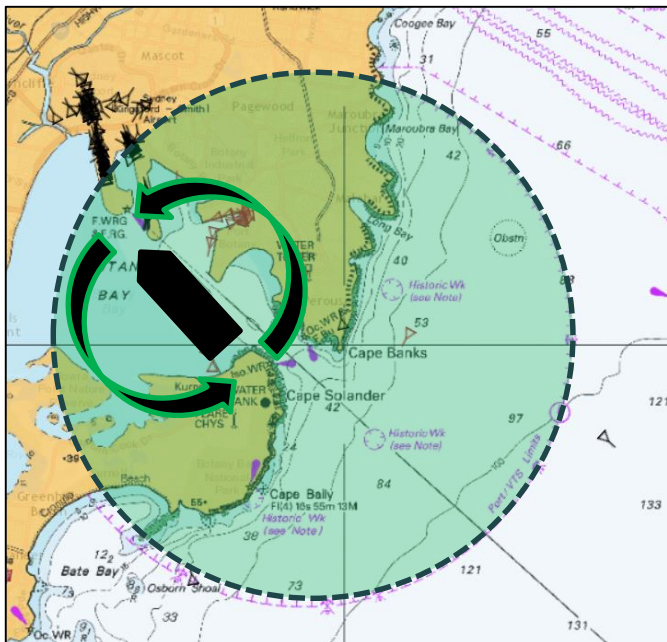
No Further Action

Send Email to notify VTS centre



Vessel Inside Port VTS Area

While vessel is inside that port, the system checks for any changes.



AIS position remains inside Port VTS Area



Has the vessel situation changed?

- New deficiency or reported incident
- Updated information about a deficiency or reported incident

YES



Send Email to notify VTS centre

NO

No Further Action

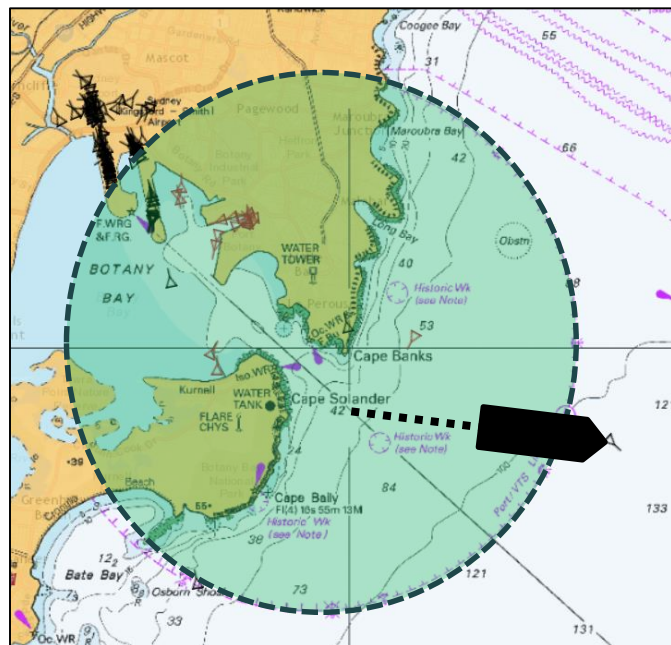




Vessel Departed a Port VTS Area Annex 2

For a vessel leaving a port VTS area, the system checks:

- if the vessel is going to another Australian Port and
- if there are any deficiencies and/or reported incidents for that vessel.



AIS position detected outside of Port VTS Area

Is the vessel going to another Australian Port?

YES

NO

No Further Action

Does the vessel have any outstanding deficiencies and/or reported incidents?

YES

Send Email to notify VTS centre

Example of Message - Vessel arrived at Port VTS Area and may be of interest

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Subject: AUMEL - vessel of interest entered bdry - GLORY RIVER, mmsi=565537000, imo=9373606

Message Body:

The vessel [GLORY RIVER](#), mmsi=565537000, imo=9373606 (at 38°20'.0 S 144°35'.9 E, 25 Apr 2017 00:08 UTC) has entered the port boundary of Melbourne (AUMEL) and has issues listed below.

[Outstanding deficiencies \(1\)](#) / [recent incidents \(1\)](#)

Type	Deficiency
Event time	25 Nov 2016 00:00 UTC
Category	11101 - Lifeboats
Description	Several free fall life boat seat head rests damaged.

Type	Incident
Event time	23 Apr 2017 00:00 UTC
Title	machinery failure - GLORY RIVER
Severity	Category 3 - less serious
Jurisdiction	high seas (outside the EEZ)
Voyage	Gladstone, QLD → Melbourne, VIC
Descriptions	machinery failure (sensitivity: NOT_SENSITIVE)
Comment	Form 18 - Water leakage from M/E gear oil cooler cooling water (fresh water) inlet pipe. 23/04 0000hrs - 0800hrs vessel stopped to carry out repairs. 23/4 0800hrs resumed voyage. REFER HPRM: D17/92005.
Status	open: Incident Created



Route Exchange

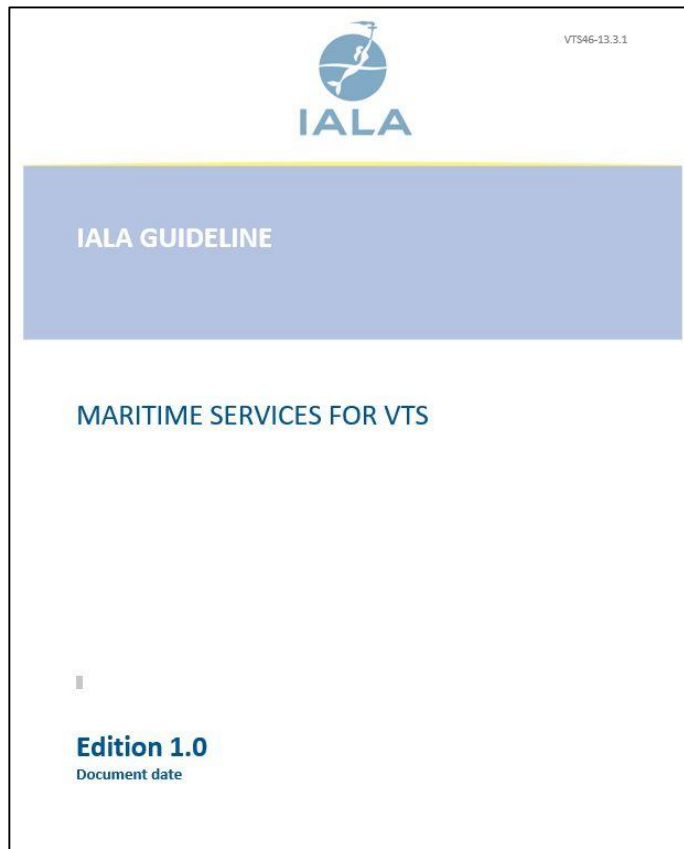
Deep draught		Moderate draught		Shallow draught	
Standard route	Alternative	Standard route	Alternative	Standard route	Alternative
Booby		Booby		Booby	
via Varzin Passage	via Gannet Passage	via Gannet Passage	via Varzin Passage	via Gannet Passage	
via East of Cairncross	via West of Cairncross	via East of Cairncross	via West of Cairncross	via East of Cairncross	via West of Cairncross
via Fairway Channel		via Fairway Channel		via Fairway Channel	
via Howicks		via Miles	Via Howicks	via Miles	
via Lizard Island/ Palfrey		Via Mid-Decapolis		via Petherbridge	via Mid-Decapolis
Two Isles		Two Isles		Two Isles	
Gubbins West	via Gubbins East	Gubbins West	via Gubbins East	Gubbins West	via Gubbins East
Via North Holbourne	via South Holbourne	Via North Holbourne	via South Holbourne	Via North Holbourne	via South Holbourne
Sandy Cape/ Archer/Swain		Sandy Cape/ Archer/Swain		Sandy Cape/ Archer/Swain	

Route Exchange

- Standard Route Plans
- *For example, “INNER ROUTE, MODERATE VIA VARZIN”*
- STM?



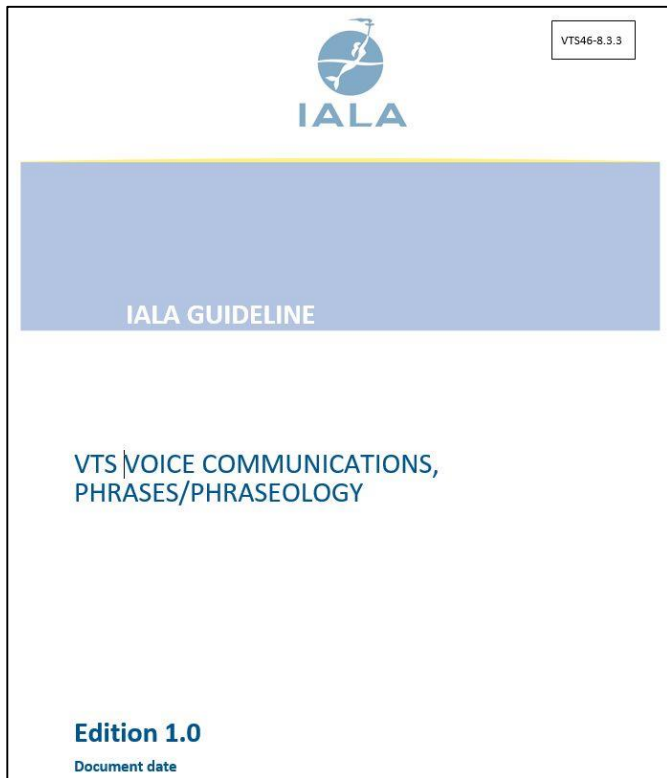
Looking Forward



- To assist providers integrate new digital services and to migrate from conventional to digital services
- Scheduled to be completed in 2021



Looking Forward



- Adoption of international standards for VTS voice communications, including structure and phraseology, suitable for both native and non-native English speakers, will significantly contribute to:
 - The provision of clear, concise and unambiguous communications; and
 - Reduce the opportunity for misunderstanding.
- Opportunities?
- Scheduled to be completed in 2020



- Digitisation is happening.
- Definition for ‘Digital Communication’ in VTS?
- Advantages of digitisation for VTS could be better documented / communicated.
 - Opportunity for shore entities to embrace digital technologies in their maintenance/upgrade schedules.



- Much of the focus to date has been on technologies and migrating existing practices to digital services. Consideration should now be given to:
 - Use of VTS Digital Phraseology
 - Enhancing existing practices
 - Identifying new practices
- The transition to digital technologies will undoubtedly provide opportunities for moving towards more “*Proactive VTS*”.



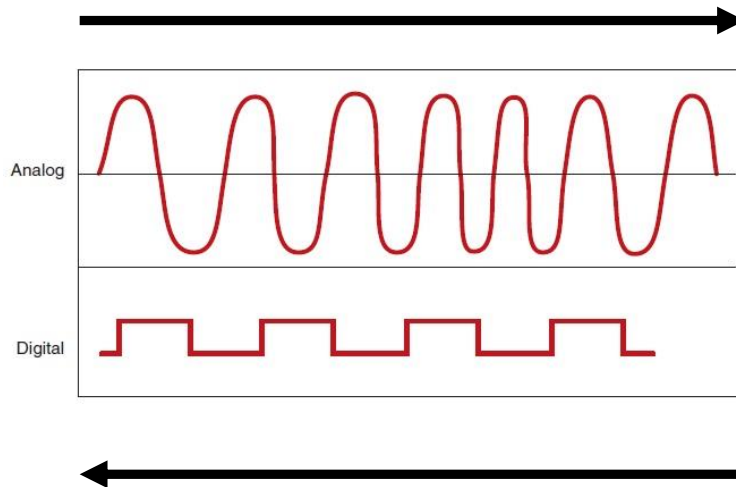
VTS in Maritime Services

- Information rich – surface picture, intent information, etc
- Communication hub
- Resourced
- Legal entity recognised by SOLAS



Concluding comments/observations

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People?