

# CDTI & Traffic Applications

Current Issues  
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# CDTI Symbol Set : Principles

- Simple
  - Must be simple for pilot training
- Consistent
  - Must be consistent and have simple rules of interpretation
  - Minimize interpretation time required
- Unique
  - Should be different from other symbols in use (e.g., VOR station symbol)
- Can have a “basic symbol” with small variations to display certain conditions (e.g., chevron for in-air; chevron with a hole for on-ground)
- Total number of symbols and symbol-variations need to be small
- Human and machine must understand the “applications currently running” explicitly (by training, display of application names, etc.) in a way that causes no confusion
- <Incomplete list>

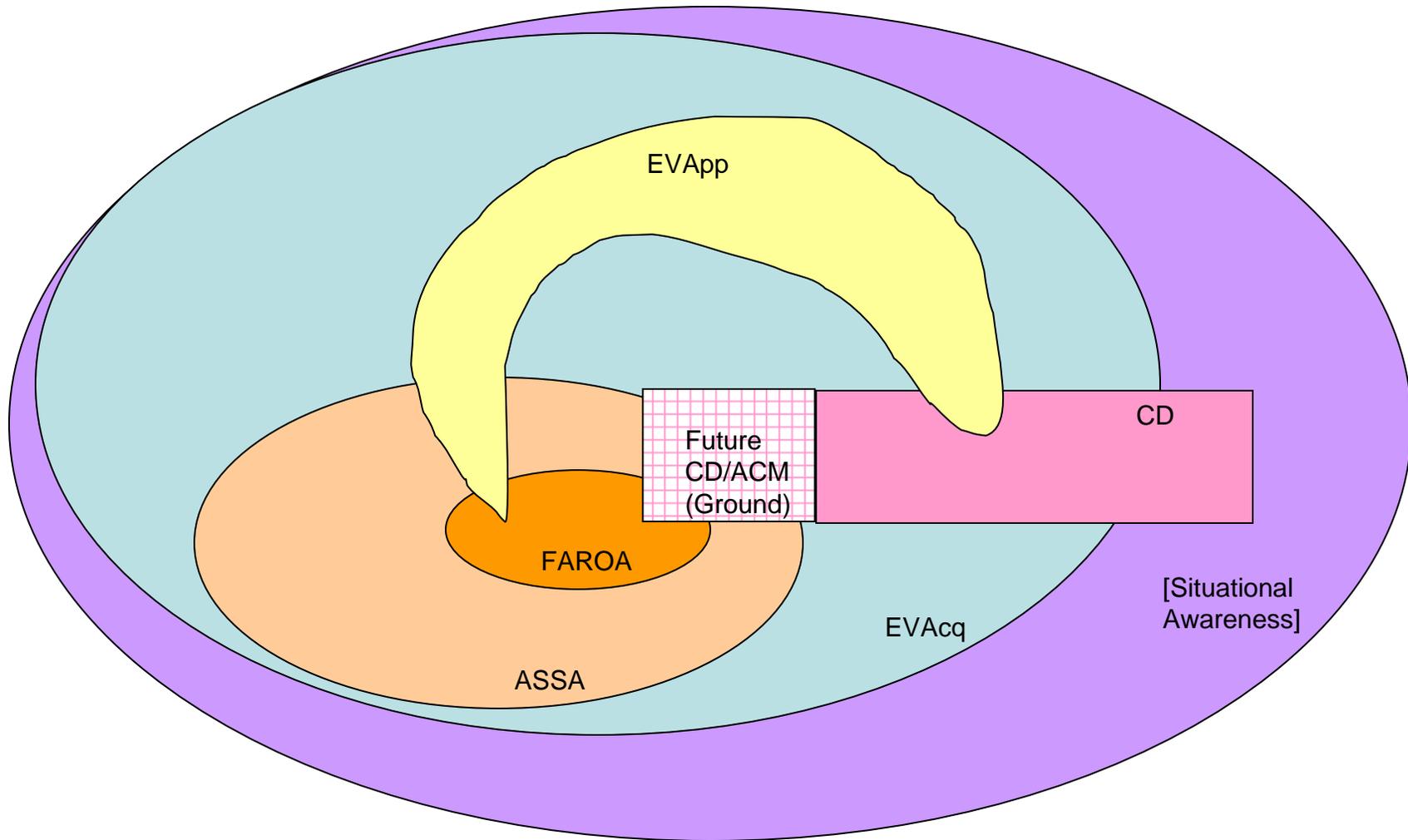
# Other Applications

- ... AND there are other applications (not in the MASPS)
  - CDTI will need to support additional applications
    - Can't "paint ourselves into a corner"
  - All the symbol set principles should be valid when future applications (not currently in the MASPS) are added to "existing CDTI"

# Issues

- The more the number of simultaneous “applications” with different data quality requirements, the more difficult it is to provide separate situational awareness (SA) for each application [simple concept] with a symbol set
  - Different levels of degradations (e.g., position, directionality) may have to be combined into one symbol in some instances
- CDTI SG intends to provide for a selection mechanism (e.g., menu item) for *applications other than SA*
  - Not appropriate to REQUIRE selection mechanism for each SA application [TBD]
  - Selection of an application will result in pilot being able to tell at a glance which traffic (targets) meet the application’s data quality
- Problem reduces to: The more the number of simultaneous “SA applications” with different data quality requirements, the more difficult it is to provide separate situational awareness for each application – the number of symbols/variations go up and violate the principles we have laid down

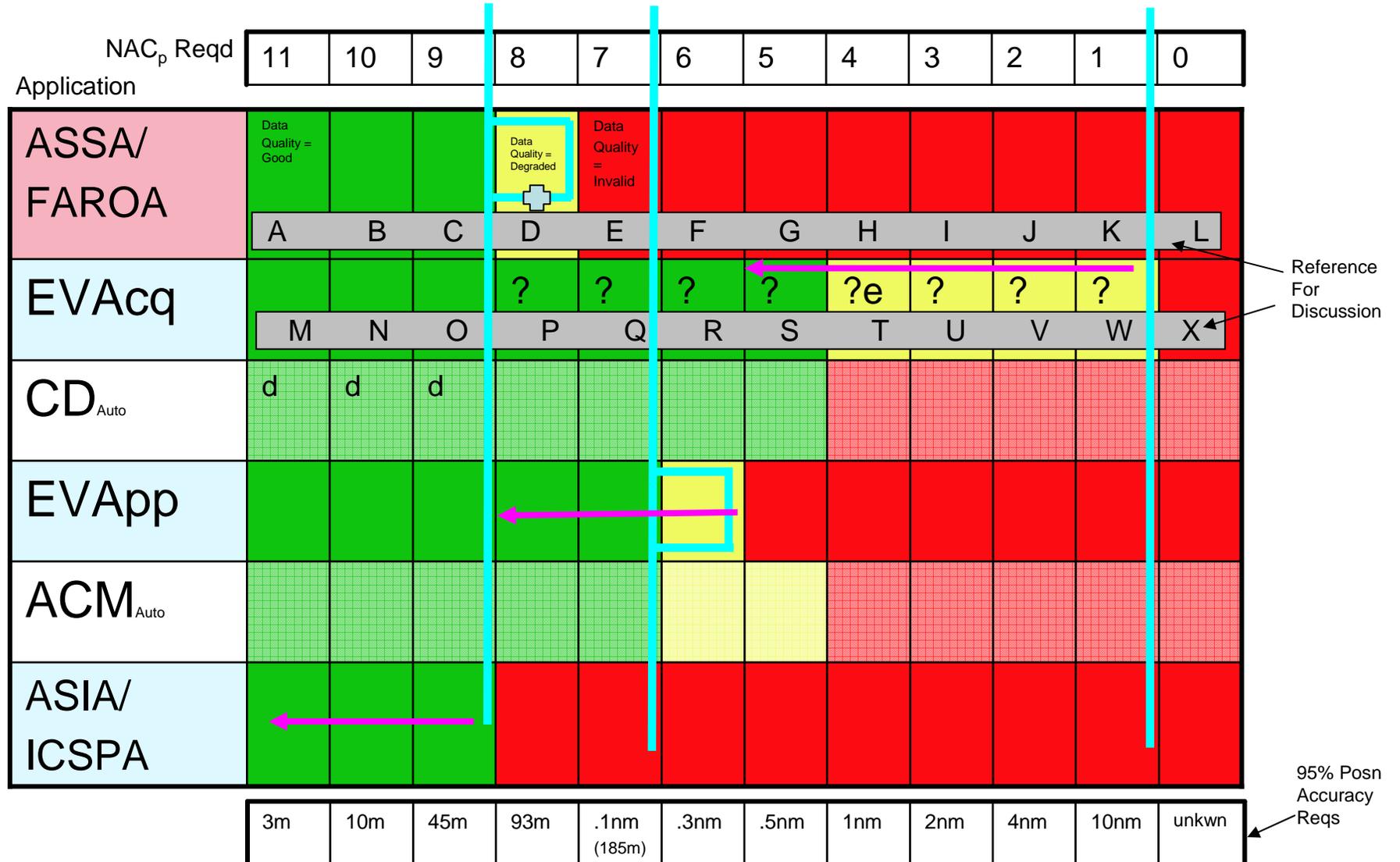
# CDTI Applications – Possible Overlap



# Application Data Quality Requirements (NAC<sub>p</sub> only)

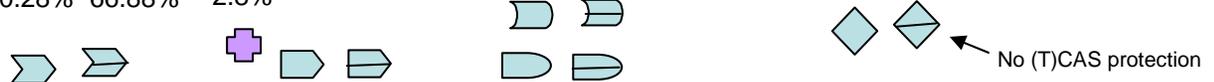
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Other factors (like velocity accuracy, time since last receipt) may affect data quality required for each application



Capstone Observed NAC<sub>p</sub> (V > 20kts) → 30.28% 66.88% 2.8%

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Reference For Discussion

95% Posn Accuracy Reqs

## Example of Problem (under discussion in CDTI SG)

Symbol Requirements (Yes/No at this time rather than what symbol):

		EVAcq		
	Data Quality	Good	Degraded	Invalid
ASSA/FAROA (EVAcq)	Good	Show Symbol (Note 1) [REF1]	Can't Happen [REF2]	Can't Happen [REF3]
	Degraded	Show Symbol (Note 2) [REF4]	Can't happen [REF5]	Can't Happen [REF6]
	Invalid	[Show symbol?] (Note 3) [REF7]	[Show Symbol?] (Note 4) [REF8]	Don't show any symbol [REF9]

Notes for table:

1. ?
2. ?
3. ?
4. ?

REFn = refers to the cell in the table

Collapse "ASSA/FAROA" to "On-Ground" while map is shown (TBD)?

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# Backup Slides

# DO-242A : NAC<sub>P</sub> Values and Meaning

**Table 2-3: Navigation Accuracy Categories for Position (NAC<sub>P</sub>).**

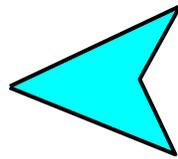
NAC <sub>P</sub>	95% Horizontal and Vertical Accuracy Bounds (EPU and VEPU)	Comment	Notes
0	EPU $\geq$ 18.52 km (10 NM)	Unknown accuracy	
1	EPU < 18.52 km (10 NM)	RNP-10 accuracy	1
2	EPU < 7.408 km (4 NM)	RNP-4 accuracy	1
3	EPU < 3.704 km (2 NM)	RNP-2 accuracy	1
4	EPU < 1852 m (1NM)	RNP-1 accuracy	1
5	EPU < 926 m (0.5 NM)	RNP-0.5 accuracy	1
6	EPU < 555.6 m ( 0.3 NM)	RNP-0.3 accuracy	1
7	EPU < 185.2 m (0.1 NM)	RNP-0.1 accuracy	1
8	EPU < 92.6 m (0.05 NM)	e.g., GPS (with SA)	1
9	EPU < 30 m and VEPU < 45 m	e.g., GPS (SA off)	2
10	EPU < 10 m <u>and</u> VEPU < 15 m	e.g., WAAS	2
11	EPU < 3 m <u>and</u> VEPU < 4 m	e.g., LAAS	2

*Notes for Table 2-3:*

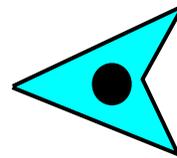
1. RNP accuracy includes error sources other than sensor error, whereas horizontal error for NAC<sub>P</sub> only refers to horizontal position error uncertainty.
2. If geometric altitude is not being reported, then the VEPU tests are not assessed.

# Example Symbols

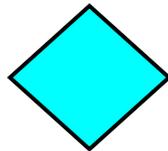
Examples for discussion only - Not "Suggested"



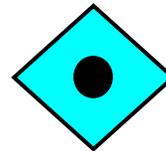
1



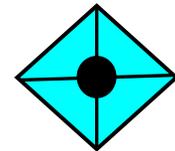
2



3



4



5 ?