RDS 2
Possible Opportunities for TMC?

MARK SAUNDERS – VICE-CHAIRMAN, RDS FORUM

PRINCIPAL ENGINEER, INTERNATIONAL BROADCASTING STANDARDS, HERE AUTOMOTIVE

CHAIRMAN, RDS-TMC WORKING GROUP, TISA

A Word about HERE

- HERE began life as 'Navigation Technologies' in 1985, when a group of Geographers and Computer Scientists collaborated to find better ways of producing digital maps.

- The company based in California, was acquired by Philips Electronics in 1990, and became a listed company as "NAVTEQ" in 2004.

- It produces the base geographical data required to produce the digital maps used in about 85% of Sat-Nav systems, both Automotive and PND, as well as on-line.

- In 2004 it began processing real-time traffic data gathered from Government and Private sources, distributing in ALERT-C format over XM and Sirius systems in USA.

- In 2005, I joined NAVTEQ in order to begin implementing RDS-TMC across North America and now I operate RDS-TMC services on almost 1,000 transmitters across five continents.

A Word about HERE

- HERE now gathers, processes and distributes traffic and other real-time information for about seventy countries across five continents, using RDS-TMC, HD-TMC, HD-TPEG, DAB-TPEG, http over the internet, and Connected using cell technologies direct to vehicles.

- In 2008, NAVTEQ was acquired by NOKIA, and the maps and traffic division re-branded as HERE.

- Last year HERE again become an independently managed company funded by a consortium of vehicle manufacturers, including Mercedes-Daimler, VW-Audi and BMW.

- HERE is a customer-driven company, not an R&D company, and subject to Customer demand and commercial judgement invest in new methods of getting Information to the end-user.

A Word about TMC

- TMC (Traffic Message Channel) is the most widely used ODA used on RDS – used both by 'Public Service' broadcasters but mainly by Traffic Service Providers as commercial revenue-generating service.

- TMC uses by default group 8A to carry efficiently-coded data relating to traffic and road conditions.

- The 37 bits available in the 8A group detail, using a series of codes:
  - the nature of the problem or warning, the speed of traffic flow, road conditions, adverse weather, accidents etc;
  - the road and location affected and its extent, the direction;
  - how long the situation is likely to continue;
  - whether the problem is serious enough that a diversion should be taken.

A Word about TMC

▶ This information is all contained in a single RDS 8A group

TMC TYPE 8A GROUP - SINGLE GROUP MESSAGE
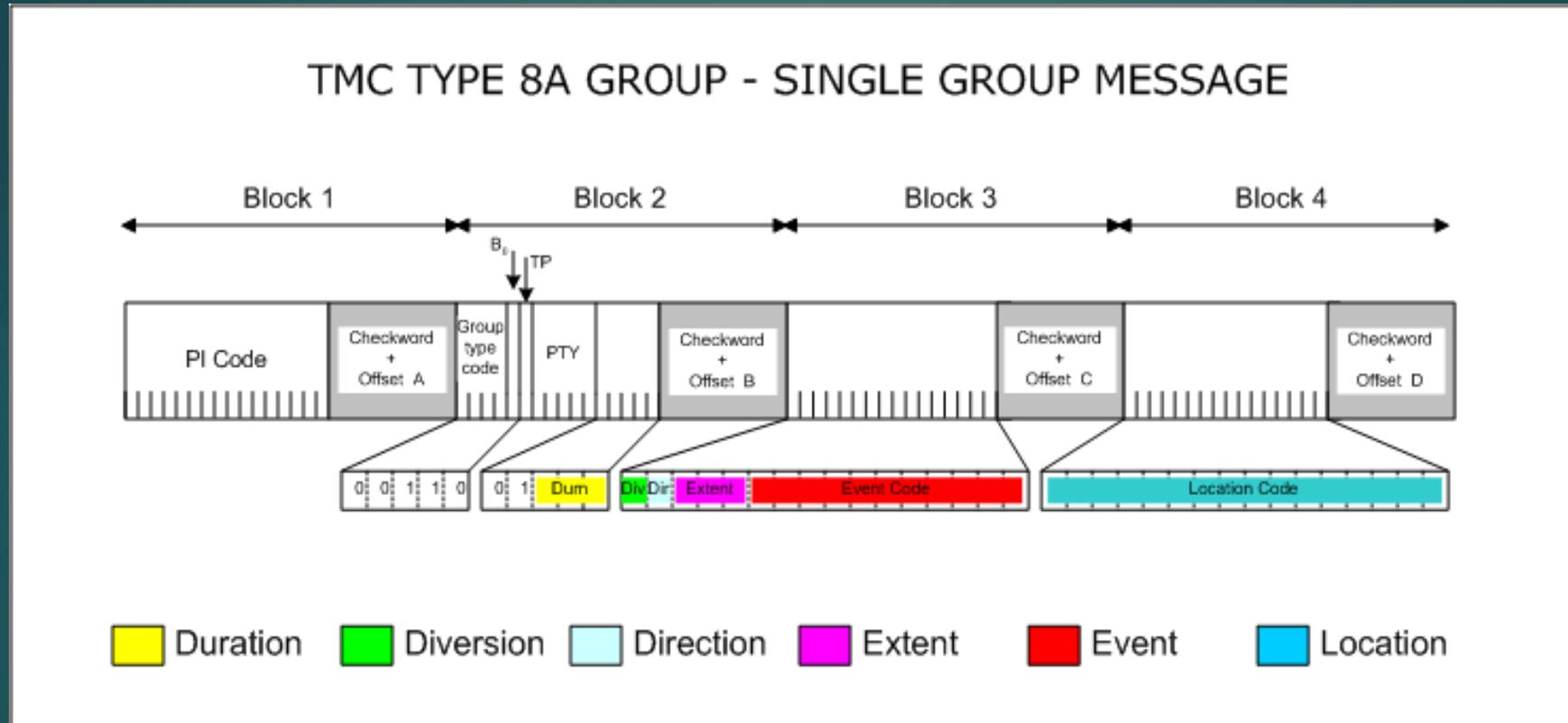
▶ Extra detail can be added by using additional 8A groups.

An example of TMC coding
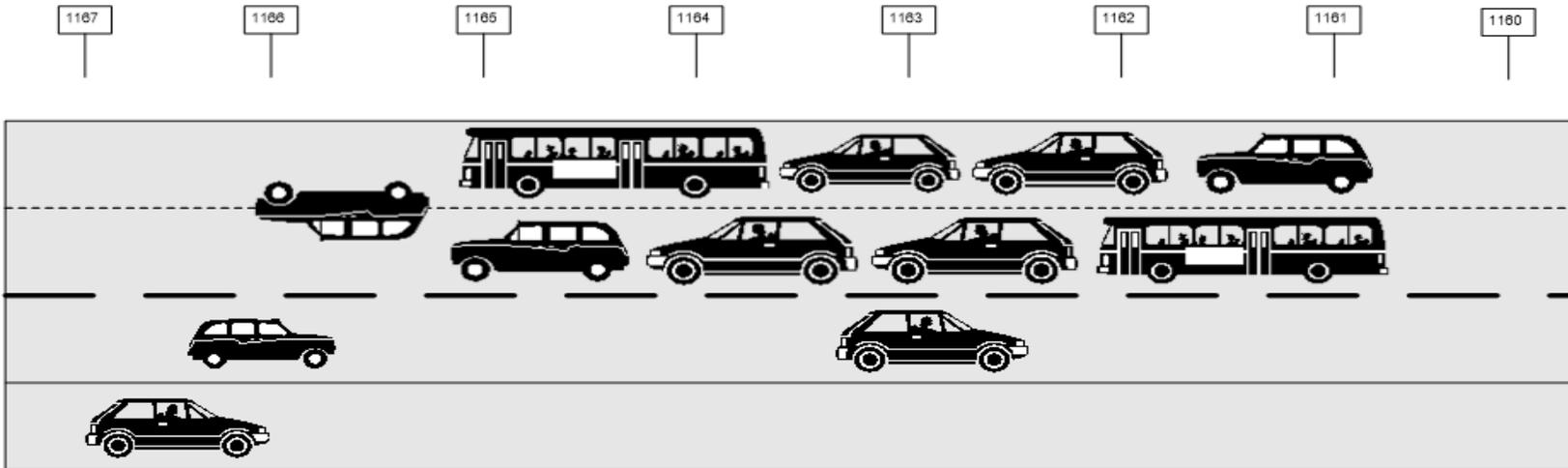
Transmitted as:

EVENT CODE - 360

LOCATION CODE - 1166

DIRECTION – 1 (negative)

EXTENT – 5

DURATION – 4

DIVERSION – 1 (Yes)

Decoded by TMC Receiver as:

Overturned vehicle - Stopped Traffic

US34 Ogden Ave. Westbound/111th St.

Tailing back to:

US34 Ogden Ave. Westbound/IL Rte 59

The situation is expected to last for the next two hours
A Diversion is recommended

A Word about TMC

- TMC is not a 'core' RDS feature, unlike PS, AF, and RT, so by the time that these core RDS features are transmitted there isn't much capacity left for TMC use.

- Although RDS is robust, an occasional bit-error in a PS or RadioText message is relatively unimportant, whereas a bit error in TMC could put the accident at the wrong location, or the wrong side of the road.

- For this reason, a TMC message is sent three times (three successive 8A groups), and the receiver must receive an identical message at least twice before using it.

- In fact, 2.85 RDS groups/second is the maximum rate at which TMC can be broadcast, and as each TMC message is transmitted three times, less than one TMC message per second may be transmitted.

- It is important to get information to the driver quickly – five minutes maximum – so RDS-TMC is limited to 250 messages.

RDS-TMC limitations

▶ 250 messages per transmitter may seem good, and indeed when TMC was first introduced in about 2000, this was an enormous number when compared to spoken traffic news, with not more than about ten messages each twenty minute traffic news bulletin.

▶ However, due to how traffic news is now gathered, and road conditions determined, we now have thousands of conditions to report: we know the speed of vehicles on every section of every road in dozens of countries and where there are closures, accidents and congestion.

▶ So we have to be selective about what we report : generally we have only the 'capacity' on RDS-TMC to report on the motorways and main trunk roads, even though we have all the data for the more minor roads and the urban streets.

RDS-TMC Limitations

- Typically – all capacity used with just Major Roads (FC1 and FC2)

Can RDS2 help TMC ?

▶ Yes – if there is extra RDS capacity, created by using additional sub-carriers, capacity for TMC can increase substantially.

▶ The additional sub-carrier, doesn't have to carry the 'core' RDS features PS, AF, RadioText, or even the PI Code, so…

▶ …the whole of an auxiliary sub-carrier can be devoted to TMC.

▶ Using one ot the aux sub-carriers exclusively for TMC, provides an additional 500% capacity for messages, meaning that 250 TMC messages per minute, or 1,250 in five minutes can be sent on the aux sub-carrier.

Options for RDS2-TMC

- There are hundreds of thousands of RDS-TMC receivers in use, both fitted in cars and as hand-held devices.

- These must continue to work and be unaffected if an auxiliary sub-carrier is used.

- In countries where an RDS-TMC service is already running, one logical approach to keep things unchanged on the 57kHz sub-carrier (FC1 and FC2 roads only)…

- … and to add an auxiliary sub-carrier carrying the FC3…FC5 information.

- Using ¼ of the main sub-carrier and all of one auxiliary sub-carrier for RDS2-TMC, would give at least 300 messages per minute, a six-fold increase in message numbers, or a six-times faster throughput of messages.

Options for RDS2-TMC

An RDS2-TMC device uses both the main sub-carrier + aux sub-carrier

Options for RDS2-TMC

▶ An alternative approach is still to leave the main sub-carrier unchanged with FC1 and FC2 information only…for existing receivers…

▶ …with the auxiliary sub-carrier carrying all information FC1 thru FC5… with new receivers getting all TMC information just from the auxiliary sub-carrier but five-times faster than using the main sub-carrier.

Options for RDS2-TMC

▶ In theory, it would be possible to use the whole capacity of all three auxiliary sub-carriers, as well as ¼ capacity on the main sub-carrier…

▶ …which would increase the number of messages about sixteen-fold, or reduce transmission time from five minutes to less than twenty seconds…

▶ …or a combination of say four times the information delivered four times quicker.

▶ But even using just one auxiliary sub-carrier, the amount of locally-relevant traffic information that can be delivered by RDS2-TMC is enormous as this capacity exists on every one of dozens of local transmitters, so is an extremely powerful delivery mechanism, providing far greater capacity than using TPEG when carried over a national or regional DAB multiplex for example.

▶ And, unlike a 'connected-service' there are no data-plans to sign-up to, so no on-going cost for the driver using RDS2-TMC.

RDS2-TMC and TISA

I chair the TISA (Traveller Information Services Association) Working Group, which has the responsibility for maintaining and updating the standards for RDS-TMC – the ISO 14819 series of specifications.

One of the tasks, now that the RDS2 Specification is close to being finalized by the RDS Forum, is to update the 'protocol' part of the RDS-TMC standards (14819-1) to account for the opportunities that the use of the auxiliary sub-carriers provides for RDS-TMC.

Within TISA we will consider the two possible options I've outlined for RDS2-TMC implementations, look at other options, and detail good practice when adding a second sub-carrier for TMC use to an existing service, or starting a completely new RDS2-TMC service in a country.

Will RDS2-TMC be implemented?

► That depends on the industry – and some of you in this audience.

► HERE, as I said earlier is driven by the needs and wishes of its customers.

► If a customer recognizes that RDS2-TMC provides a cheap, reliable distribution built on technology proven over fifteen years, and one that can be used in any country that uses FM Radio (and that's all countries world-wide), then, just like any other technology that is wanted and for which we can make a sound business case, then HERE will support it – we're 'agnostic' about what distribution we use – which is why we support them all.

► If a customer is interested in RDS2-TMC then I and HERE will build a business case, seek broadcast partners, encoder manufacturers, and work with device manufacturers to make it happen

Thank you