Thank you for joining!

Meeting will start shortly
Connected Safety
Birds of a Feather Working Group

All Members Meeting
April 17, 2024

Hosted by:

Tim VanGoethem
Chief Product Officer
Emergency Safety Solutions

Larry Williams
Co-founder
LiDAR Saving Lives Public Safety Coalition
Today’s Agenda

• Welcome and Introductions – Tim VanGoethem & Larry Williams

• Connected Safety BoF & Journey Map Recap - Tim VanGoethem

• Enabling accurate and prompt implementation of rescue services and start of emergency response
  • Visual contextual information - Magnus Andersson (Terranet AB, )
  • Gaps for Intelligent Collision Data to PSAPs - Guillaume Ouellette (WirelessCar)
  • State of Connectivity to Emergency Services - Roger Lanctot (TechInsights)

• Upcoming Meetings - Tim VanGoethem

• Next Steps and Close
Bring together public safety, automotive, commercial transportation, and government to make our roadways safer for everyone:

- Define comprehensive stakeholder-based safety-related scenarios and value propositions
- Collaborate with COVESA members and others safety-related organizations to develop safety expertise and community within COVESA
- Develop integrated safety system prototypes and references implementations
- Publish white papers on key findings, best practices, and implementation recommendations
Accelerate delivery of connected technologies to benefit everyone that shares, protects, and maintains our roadways. Examples:

- Protect and give aid to vulnerable vehicles and occupants stranded along roadways
- Reduce response time and secondary collision risk for motorists involved in a crash
- Provide 911 Public Safety organizations with critical information so that they dispatch the right personnel and equipment to the scene
- Mitigate liability and lost productivity for commercial vehicles involved in roadway crashes
Journey Map Example (1 of 2)

### Imagery
Cartoons, animated presentations, or demonstrations that bring storyline to life

### Storyline
Overall story that we’re bringing to life

### Value Proposition
The value that each company and technology brings to this story

<table>
<thead>
<tr>
<th>Set-up</th>
<th>Scene 1</th>
<th>Scene 2</th>
<th>Scene 3</th>
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<tr>
<td>![Set-up Image]</td>
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**Imagery**
Sophia is a 24-year-old professional that is commuting to work in her new EV.

**Storyline**
A tanker truck abruptly changes lanes, collides into Sophia's car, and forces the driver of a rental car to swerve into a nearby lake. The embedded vehicular emergency sensor triggers the submersion escape system in the rental car and instantaneous IP notification for emergency services in all vehicles.  

1. **Automated submersion system enables rental car occupants to escape quickly.**
2. **Instantaneous IP notification enables accurate and prompt implementation of rescue services and start of emergency response.**

**Value Proposition**
Recognizing that a collision has occurred, all three vehicles automatically flash hazard and other vehicle lights at a faster rate so that other drivers have more time to react, and Emergency Responders can see them.

1. **Conspicuous lighting protects scene, gives other motorists time to slow down and move over, and helps locate vehicles that has left the roadway.**
2. **Digital alerts work in tandem with lighting alerts to protect the scene and give motorists time to slow down and move over.**
3. **Timely notification of vulnerable vehicle location reduces response time and further collision risk.**

In parallel, on-coming drivers receive an alert in their in-dash system so that they have even more time to react to the upcoming crash scene.

The nearby E911 center is notified and dispatches a police car, fire truck, and ambulance to the scene.

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1. Separate Journey Maps can be used to capture the stories for the tanker truck and rental car occupants since they unlock different solutions and value propositions. The following scenes will focus on Sophia.

© Copyright Emergency Safety Solutions 2023
The E911 Dispatcher sees that the tanker truck has leaked potentially hazardous materials onto the road. Fire responders are provided a VIN-specific extrication guide for Sophia’s EV. Sophia see a map indicating her location with icons for the responding vehicle location and their projected ETA. Responders arrive on scene and safely remove Sophia from her vehicle. Sophia seems OK but is taken to the hospital for further medical evaluation.

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- LiDAR/radar/camera 3D point cloud lets E911 Dispatcher assess scene and better inform emergency & incident responders what to expect.
- Point Cloud image protects privacy since no identifying information is visible.
- Emergency Responders can safely extract victims without compromising the vehicle’s power wiring or battery system that may lead to fire or hazardous materials being spilled into environment.
- Piece of mind that someone is on their way and when they will arrive.
- Awareness that a loved one is in danger, but help is on the way.
- Reduced response time decreases risk of secondary collision.
- Proper on-scene care minimizes complications.
- Sophia is safe and can focus on recovery.
- Sophia’s family knows that she’s OK and where to meet her.

Vital health parameters are transmitted to the hospital while in transit.
Family/emergency contacts are updated.
Submerged Vehicle Needs

• ~500 US fatalities/year due to submersion
• Occupants have ~1 minute to exit before vehicle starts to sink
• Time is lost trying to open door, call for help, or wait for compartment to fill

Example “Network Effect” of Connected Vehicle BoF

• AWOS sensors to automatically roll down windows to increase occupant survival.
• Instantaneous IP notification of 9-1-1 public safety to expedite arrival of rescuers.
• Faster rescue (police, fire, EMS) with automatic emergency messaging
• Enhance visibility with automatic emergency lighting

Source: Sabrina Percher | COO & Co-Founder | AWOS Technologies
In US alone:
- 23,000 people injured or killed annually
- a crash occurs every 4 minutes
- problem is compounding at 8.4%/year

What can be done to address this?

• Building awareness
• Education/Training
• Regulatory Solutions
• Leverage Technology
  • Lighting Alerts proven to compel 87% drivers to reduce speed and move over ~1/4 mile sooner verses 30% that moved over with conventional hazard lighting
  • Digital Alerts give drivers advance warning, reducing collision risk by 90% and hard braking events by 80%

Source: Andrew Coetzee | Chief Safety Advocate | Emergency Safety Solutions
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Shaping the future of road safety

April 2024
Magnus Anfersson, CEO
CURRENT CHALLENGES TO OVERCOME

- Crash data is lost during crashes
- Information is rarely sent quickly enough, if at all
- Visual information is not sent
- Poor reliability and accuracy in data collection
- Lack of fast communication between technologies and systems
WE CAN MAKE A REAL DIFFERENCE IN CRUCIAL MOMENTS

IN ALL SCENES, SPEED AND ACCURACY ARE VITAL

SCENE 1
Tanker truck changes lanes – Crash happens
Value proposition: Instantaneous IP notification is sent to rescue services

SCENE 2
Hazardous materials leak onto the road
Value proposition: LiDAR/radar/camera 3D point cloud informs emergency responders about what to expect

SCENE 3
Emergency personnel are provided with information
Value proposition: First responders get crash-specific information on their way to the crash
IMAGINE

The world’s first end-to-end fully-integrated system for crash avoidance, detection, and instantaneous crash response by emergency responders
IMAGINE A NEXT-GENERATION 112 EMERGENCY SERVICE

That sends out real-time visual data
Giving first responders crucial pre-arrival information
Where preliminary crash data can be sent before any hardware is destroyed in the crash.

IMAGINE A NEXT-GENERATION 112 EMERGENCY SERVICE
That sends out lossless and relevant crash data, containing:

- Airbag deployment data
- In-car monitoring
- Events leading up to the crash
IMAGINE A NEXT-GENERATION 112 EMERGENCY SERVICE

That you can trust in any weather or lighting conditions – Accurately recording each millisecond of the crash
IMAGINE A NEXT-GENERATION 112 EMERGENCY SERVICE

That through BlincVision’s quick detection and sensor fusion gives other sensors the time to react to the danger.
In 70% of all accidents with pedestrians, cars actually have adas systems
WE STRIVE FOR ZERO TRAFFIC CRASHES

But when crashes do occur, we want to enable the smartest and most efficient emergency response possible.
BlincVision - the **fastest** and most **accurate** anti-collision system for automotives in urban road traffic
FOR US – EVERY METER MATTERS

FOR YOU – EVERY SECOND COUNTS

Integrating the fastest and smartest ADAS system with the fastest, smartest and most effective emergency response possible

Post-crash care for when crashes do happen
ROAD SAFETY IS A GLOBAL ISSUE
1.3 million people die in traffic every year. 40% of the fatalities occur in urban areas.
More than 50% of all road traffic deaths are among vulnerable road users: pedestrians, cyclists, and motorcyclists.
City traffic is getting more and more complex
Terranet is redefining what it means to move safely in urban traffic
NEW REGULATIONS, TECHNOLOGICAL DEVELOPMENT, AND EFFECTIVE COLLABORATION IS KEY TO ACHIEVE VISION ZERO!

THINGS ARE MOVING IN THE RIGHT DIRECTION
NEW SAFETY REGULATIONS DRIVE DEMAND FOR BLINCVISION AND MORE ADVANCED AUTOMATIC EMERGENCY BRAKING (AEB) SOLUTIONS

Road Fatalities

- 2001
- 2017
- 2022
- 2023
- 2024
- 2030
- 2050

- AEB mandatory in new vehicles in EU
- AEB requirement proposed by NHTSA and FMCSA
- EU Pedestrian and bicycle detection Regulation
- UN Decade of Action for Road safety
- Vision Zero

PASSIVE SAFETY TECHNOLOGY
ACTIVE SAFETY TECHNOLOGY
Vulnerable road users is a top priority

> Technical constraints

> Low latency is important

> 2026 revision is going to be tougher
ABOUT TERRANET

We are a technology development company with a passion for cutting-edge sensor technologies.

We consist of world-class engineers and experts from across the world and a variety of sectors.

Offices in Gothenburg, Sweden and Stuttgart, Germany with a HQ in Lund, Sweden.

Listed on Nasdaq First North Premier Growth Market since 2017 (TERRNT-B).
1. Understand the current landscape
2. Understand what the need is
3. Establish strategies that work for key stakeholders
4. Get on with it with ongoing dialogue
1. Understand the current landscape
2. Understand what the need is
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The value chain

- OEM
- Connectivity
- Occupants
- TPS Call Centre
- PSAP
- First Responders
The value chain

- OEM
- Connectivity
- Occupants
- TPS Call Centre
- PSAP
- First Responders
OEMs add hardware or services in vehicles if it will…

- Sell more cars or generate revenues
- Reduce costs or improve efficiencies
- Regulatory requirement
The value chain

- OEM
- Connectivity
- Occupants
- TPS Call Centre
- PSAP
- First Responders
Connectivity partners

Whether in-housed or outsourced, they are limited to:

- The hardware in cars
- The data exposed to the cloud
- The features requested by the OEM
The value chain

- OEM
- Connectivity
- Occupants
- TPS Call Centre
- PSAP
- First Responders
Every country has different setups for 112/911/999

Source: EENA 2023 PSAPs Global Edition
The value chain

OEM  Connectivity  Occupants  TPS Call Centre  PSAP  First Responders
Every country uses different technology

Example: difference of equipment in police vehicles between two countries:

100% radio dispatch

Mix of radio and CAD

There is no “one way” things are done, even within one country.
Public Safety Agencies

They have:

- Limited and often reducing budgets
- Complex setups
  - Example: UK has 45 police services with
    - Different dispatch systems
    - Different vehicles
    - Different uniforms
    - Different equipment
- Different IT suppliers, consortiums
- Different standard operating procedures
- Different expectations of emergency services by the public

Public safety organizations do what they do because based on their definition of success, it works, changes to this requires thorough reviews and receives much scrutiny
1. Understand the current landscape
2. Understand what the need is
3. Establish strategies that work for key stakeholders
4. Get on with it with ongoing dialogue
Improve the context

Example:

• Belgrave Middleway incident in Birmingham, 2017
• Seven vehicles involved
• Six deaths
• Caused by a young driver in a performance car under the influence at 100mph
The mission

Getting the right help, to the correct location, with the right equipment, as quickly as possible.
Where TPS eCall helps today

PSAPs have refined their approaches over decades, the advent of eCall has brought benefits:

- Especially in North America, simply making the data available outside of the car
- Validating the call and only passing “real” cases to the PSAP
- Understanding the customer’s language immediately
- Staying on the line with occupants for as long as it takes
- In the EU, going beyond the MSD as technology advances
- Building relationships with PSAPs

The downside:

- Delay of reaching the PSAP for critical cases
- Especially in North America, customers unaware subscriptions have expired
- Inconsistency of data available to establish the context
- Only provides data on the subject vehicle, PSAPs must merge calls
1. Understand the current landscape
2. Understand what the need is
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Call Center Services - WirelessCar Mission

TPS eCall / ACN
Manage critical situations and encourage PSAPs to engage the right resources to each situation

bCall
Respond confidently to breakdown and malfunction situations

SVT
Manage legitimate vehicle theft situations and increase the opportunity to recover a customer’s vehicle

iCall
Provide the right information to the customer at the right time to make each journey as enjoyable as possible

Providing call centres with the best possible context from connected cars to help customers in moments of anxiety or distress
**Improve the context**

The core objective is to save more lives, followed by helping people cope with moments of anxiety and distress.

**Information commonly available today:**
- Precise location of the event
- Number of occupants
- Are occupants belted
- Speed of the collision
- Which SRS components were deployed

**Information sometimes available today:**
- Language of driver
- Which collision system was triggered
- Likelihood of injuries

**What is not fully achieved today:**
- Clear executive summary of the collision
- Make the data and context easily sharable
- Evidence of the credibility of the data
Our Eco System Cocreators

For the past 25 years, WirelessCar has been working with partners that enrich the entire value proposition.
Evolution of the WirelessCar CCC
Enabling the start of a bCall from a smartphone, using data residing on the OEM companion app (including vehicle status, phone location, user’s name, etc.), passed to the app API via the BFF.

In the EU, governments provide guidance to not remain in a broken-down car on fast roads, but bCall asks a customer to do just that. Additionally, a car bCall cannot be started if the vehicle has no power.

- Provide call centre agents with both phone and car locations, static and dynamic data
- Increase the usefulness of existing companion apps
- Provide improved context to call centre agents
- Add a digital experience where embedded connectivity is not possible or viable

- Work underway, onboarding from June 2024

- Contribute to the user stories for subsequent releases
- Early adoption by June 2024
The WirelessCar Outlook

- The EU is being driven by regulation (e.g., 16102) and programmes (e.g., Euro NCAP)
  - TPS eCall must be offered for the “life” of the car (often 10 years)
  - Regulation-driven
- US being driven by business models
  - SOS/TPS eCall is often attached to short subscriptions
  - Improvements often made by new actors on the value chain requiring revenues

Example goals:

<table>
<thead>
<tr>
<th>Steps</th>
<th>Fragmented</th>
<th>Show Value</th>
<th>Grow Usage</th>
<th>Standardization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value chain coordination</td>
<td>Ad hoc</td>
<td>10-25% of markets</td>
<td>50% of markets</td>
<td>&gt;80% markets</td>
</tr>
<tr>
<td>Data sharing</td>
<td>US: Limited integrations EU: Voice, email</td>
<td>US: Limited integrations, data viewing EU: Email, direct data viewing</td>
<td>&gt;10% API integration</td>
<td>&gt;40% API integration</td>
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</table>
1. Understand the current landscape
2. Understand what the need is
3. Establish strategies that work for key stakeholders
4. Get on with it with ongoing dialogue
Saving more lives every day through collaboration

**OEMs**
- Volkswagen
- Mercedes-Benz
- Land Rover
- Subaru
- Seat
- JLR
- Nissan

**Call centre operators**
- Agero
- Ventura
- Allianz
- Teletrac
- BT
- Navmar

**Industry groups**
- COvesa

**Regulatory / Programmes**
- NHTSA
- IIHS
- Euro NCAP
- Thatcham

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[WirelessCar logo]
Let's connect

Guillaume Ouellette
Product Manager
The State of Connectivity to Emergency Services

April 2024

Roger C. Lanctot

Presentation to MWC 2023 Las Vegas
Authoritative Semiconductor & Microelectronics Intelligence Platform

Leveraging a unique reverse engineering competency, we reveal innovations in technology products that provide advanced technical and market analysis to organizations that will help guide them to make fact-based technology and intellectual property decisions.

**Reverse Engineering**

We help decision makers in semiconductor, system, financial, and communication service provider companies make more informed decisions on their product roadmaps with competitive technical intelligence.

We help supply chain and procurement professionals to more effectively negotiate with suppliers and understand true costs of technology products.

We collaborate with IP professionals in global technology companies, licensing entities and legal firms to plan strategies on the assertion/defense of their patent portfolios and licensing negotiations.

**Market Analysis**

We help business and technology leadership de-risk strategic investment and procurement decisions with visibility into semiconductor manufacturing, silicon demand, and capacity.

We enable more informed decision-making for product and market strategy with curated insight into the performance, application, and functionality across individual SoCs and aggregated across market segments.

This is all supported by building out stronger products from acquisitions (The Linley Group, VLSI and most recently with Strategy Analytics. Read more about Strategy Analytics [here](#)).

**Spend Insights**

We help competitive analysis teams at OEMs and component suppliers to understand design philosophies and BOM costs through deep-dive hardware teardowns of consumer electronics devices. This is delivered through the world’s largest library of independent and nonbiased teardowns.

We help supply chain and category management teams to understand pricing and lead-time trends for the commodity electronic components that engineers are selecting for new designs.
Let’s be Honest about Car Connectivity
The Automotive Industry Has Lost Its Way

A. GM dissolves OnStar as a standalone division
B. Next Gen eCall still relying on “minimum set of data”
C. Car makers obsessing over data monetization
D. Highway fatalities continue to rise
E. Loss of focus on the original purpose of connectivity – to speed emergency response, save lives
What’s at Stake; What is Possible

A. The focus has shifted to collision avoidance
B. Auto makers are avoiding the post-crash care discussion – and responsibility
C. NG eCall shifts to packet-switched IP-based solution – a tiny step in the right direction
D. Failure to recognize the need for fast-as-possible communication of post-crash status of vehicle and passengers
E. Immediate data delivery must be the priority
What is Possible

A. Cars come with faster networks, faster processors, faster wireless connections – but same old eCall
B. Data transmission must take priority – even if the voice call is preserved
C. The prioritization of safety is essential
D. This will define what connectivity actually means to the consumer
E. Today, connectivity means nothing to the average consumer – it means more to the car maker
# What Actually Happens after a Crash?

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- Automated submersion system enables rental car occupants to escape quickly.  
- Instantaneous digital, sensor-driven IP notification enables accurate and prompt implementation of rescue services and start of emergency response.  
- Conspicuous lighting protects scene, gives other motorists time to slow down and move over, and helps locate vehicles that has left the roadway.  
- Digital alerts work in tandem with lighting alerts to protect the scene and give motorists time to slow down and move over.  
- Timely notification of vulnerable vehicle location reduces response time and further collision risk. | Recognizing that a collision has occurred, all three vehicles automatically flash hazard and other vehicle lights at a faster rate so that other drivers have more time to react, and Emergency Responders can see them.  

| **Value Proposition** | The nearby E911 center is notified and dispatches a police car, fire truck, and ambulance to the scene.  

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What Data Do First Responders Need?

A. How many people in the car?
B. How severe was the crash?
C. Where is the car? - Upside down? Underwater?
D. Is the car ICE/EV/PHEV/Hybrid? What are the extraction requirements?
E. Will other drivers be notified of the crash location?
F. What are known existing health conditions of driver?
G. Is the car stolen?
What is the Legacy of Angela Chao?
What about the Francis Scott Key Bridge Collapse?

AWOS: Message in a Bridge Collapse
If 5G isn’t about Saving Lives, Why Bother?

A. Safety relevance
B. Future proofed
C. Enhanced performance for safety, infotainment
D. Multi-modal communications
E. Tele-operations
F. Satellite connectivity?
What do car companies want?

A. A single global connectivity platform
B. Best connection at all times
C. Carrier independence
D. Integration of vehicular and non-vehicular connectivity
E. Unlimited automotive wireless data plans
F. More reliable/comprehensive coverage
G. Prioritization of automotive (safety) applications
H. NONE OF IT HAS ANY VALUE IF IT IS NOT SAVING LIVES!
V2X Forecast

- Forecast without EU or US mandate
  - 968k shipments in 2021 to 29.2M in 2030
  - C-V2X will dominate with 27M units vs. 1.2M DSRC shipments in 2030
  - Mandates in the works but timelines remain in flux
  - Without mandates, V2X will continue to flounder
  - 90% of V2X deployments will be in China over the next 3-4 years
  - V2X should follow closely with 5G implementation in vehicles – Ford in US?

![Graph showing V2X shipments and penetration over time](source: TechInsights (2023))

- Thailand
- South Korea
- Russia
- ROW
- NA
- Japan
- India
- Europe
- China
- Brazil
- WORLD

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<th>Year</th>
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<td>5,681</td>
<td>19,440</td>
<td>30</td>
<td>23,643</td>
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</tbody>
</table>

Global Penetration:
- Thailand: 0%
- South Korea: 1.3%
- Russia: 0.0%
- ROW: 0.0%
- NA: 2.9%
- Japan: 7%
- India: 1.5%
- Europe: 3.2%
- China: 1.2%

Penetration:
- Thailand: 0%
- South Korea: 70%
- Russia: 60%
- ROW: 50%
- NA: 40%
- Japan: 30%
- India: 20%
- Europe: 10%
- China: 5%
TechInsights forecasts that shipments of systems with embedded 5G modems will increase from 562K units in 2022 to an estimated 52.7M units by 2030 at a CAGR of 76.3%.
What has Defined the Car?


**MECHANICAL**
- Benz Patent Motorwagen
- Ford Model T
- 1932 Ford with Flathead V8
- Volkswagen Beetle

**ELECTRONIC**
- Bendix Electrojector / Bosch D-Jetronic
- ABS Braking
- Stability Control

**SOFTWARE**
- Apple iPhone
- Tesla Model S

CONNECTIVITY!!!
The Software-Defined Car is Built on Connectivity...

- Well over half of vehicle produced globally are now connected.
- There is an increasing need for a connection mediation gateway capable of managing connectivity based on:
  - **Type**
    - Wi-Fi, LTE/5G, Satellite (LEO or GEO)
  - **Application**
    - Safety, streaming...
  - **Availability/Quality of signal**
    - Intermittent connectivity is a big problem for data uploads/downloads to vehicles in motion.
  - **Cost**
    - Do I need this data transfer now? Or can it wait and be cheaper later on?

Source: Automotive Infotainment & Telematics – Systems & Features Q3 2023
Connectivity Means Safety

A. It is collision avoidance
B. It is emergency response to collisions
C. A car crash represents: the LOWEST point of customer satisfaction & the HIGHEST point of customer defection
D. What is the value of elaborate sensor portfolios and connectivity if we do not capture and transmit the data?
E. Data matters; Data saves lives
Any Questions?

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## Future Meetings

<table>
<thead>
<tr>
<th>Date</th>
<th>Proposed Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 2, 2024</td>
<td>Emergency Vehicle Crashes</td>
</tr>
<tr>
<td>June 6, 2024</td>
<td>On-Board Digital Alerting</td>
</tr>
<tr>
<td>July 11, 2024</td>
<td>Instantaneous 9-1-1 Notification and Computer-Aided Dispatch</td>
</tr>
<tr>
<td>August 1, 2024</td>
<td>Post 9-1-1 Computer-Aided Dispatch</td>
</tr>
<tr>
<td>September 5, 2024</td>
<td>Real-Time Crash Identification and Data Analytics</td>
</tr>
</tbody>
</table>

* Will define and kick-off a project in this timeframe
More Information

- COVESA Connected Safety BoaF wiki page

- Register at following link to join mailing list:
  https://docs.google.com/forms/d/12jd9LGtOkQXjeiably2pdAli9RD1DBqJQxvGiKDSdNo/edit