



# SafetyConsult

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The Sense of Safety

# О SafetyConsult

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- На рынке с 2020 года и в нашей команде более 10 экспертов.
- Мы оказываем услуги по обеспечению функциональной безопасности, кибербезопасности и надежности в рамках проектов, а также помогаем с внедрением методов системной инженерии
- Наша специализация - тренинги и проектная работа для заказчиков по всему миру
- Вместе с нами вы сможете обеспечить I3 уровень независимости аудитов и оценок ваших продуктов и процессов

# Основатели SafetyConsult

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**Олег Кировский**  
Руководитель направления  
кибербезопасности



**Ислам Бабаев**  
Руководитель направления  
функциональной безопасности



**Азиз Бейтуллаев**  
Генеральный директор компании  
SafetyConsult

# Что мы умеем?

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## Услуги

Тренинги  
Проектная работа  
Аудиты и оценки

## Области знаний

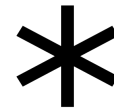
Функциональная  
безопасность  
Кибербезопасность  
Надежность  
Системная инженерия

## Индустрии

Автомобилестроение  
Машиностроение  
Нефтегазовая сфера  
Железнодорожный  
транспорт  
Беспилотные системы

# Партнеры и клиенты

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# Список наших тренингов

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- ISO 26262 Дорожные транспортные средства – Функциональная безопасность
- ISO 21434 Дорожные транспортные средства – Кибербезопасность
- ISO 21448 Дорожные транспортные средства – Безопасность целевой функции
- ISO 13848 Безопасность машин – Составные части систем управления, связанные с безопасностью
- IEC 62061 Безопасность машин – Функциональная безопасность составных частей систем управления, связанных с безопасностью
- IEC 62443 Кибербезопасность промышленной автоматике и систем управления
- IEC 61508 Функциональная безопасность электрических/ электронных/ программируемых электронных систем, связанных с безопасностью
- IEC 61511 Функциональная безопасность – Системы безопасности в процессной промышленности
- Методы анализа функциональной и кибербезопасности
- Надежность электронных систем управления
- Основы системной инженерии (SEBoK)

# Примеры тренинговых материалов

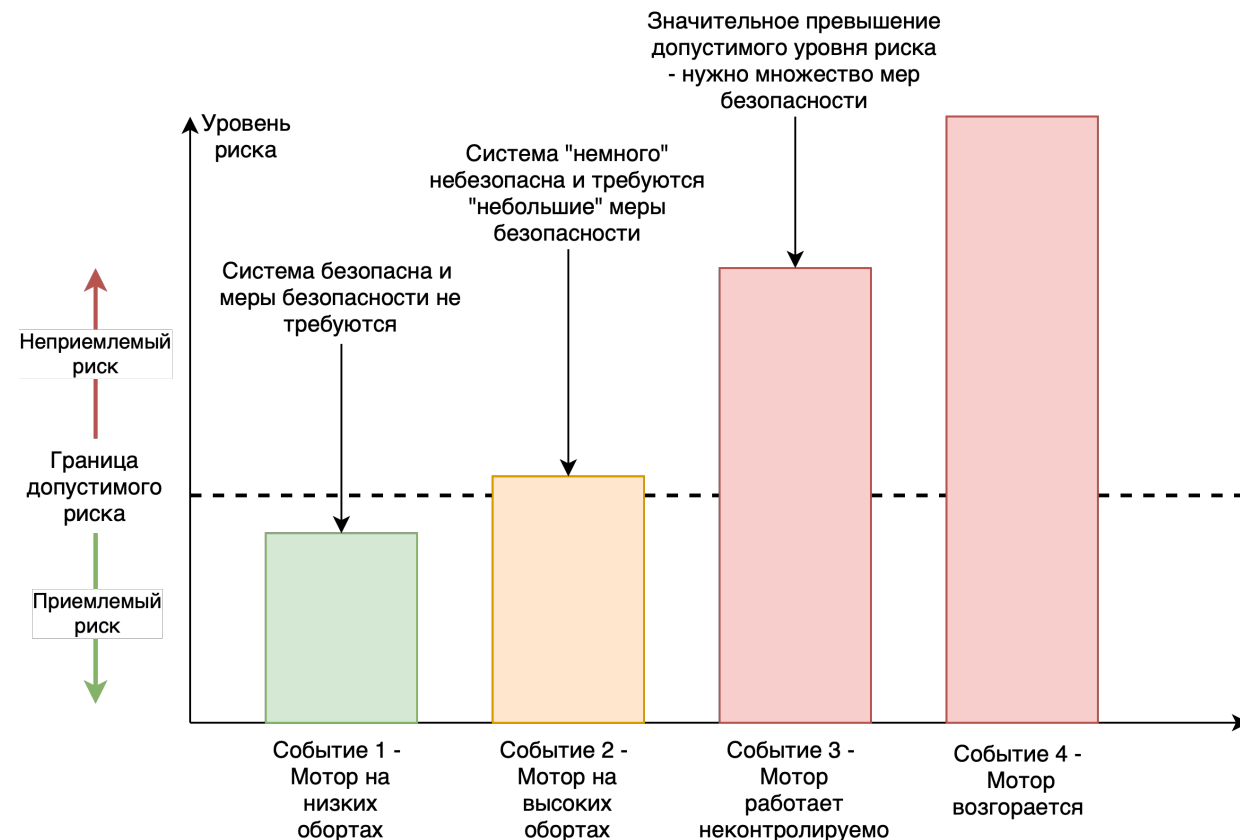
Функциональная безопасность – это отсутствие неприемлемого уровня риска, связанного с опасностями, вызванными некорректным функциональным поведением электронных/ электрических систем



Острые кромки и детали экстерьера



Неисправности контроллера



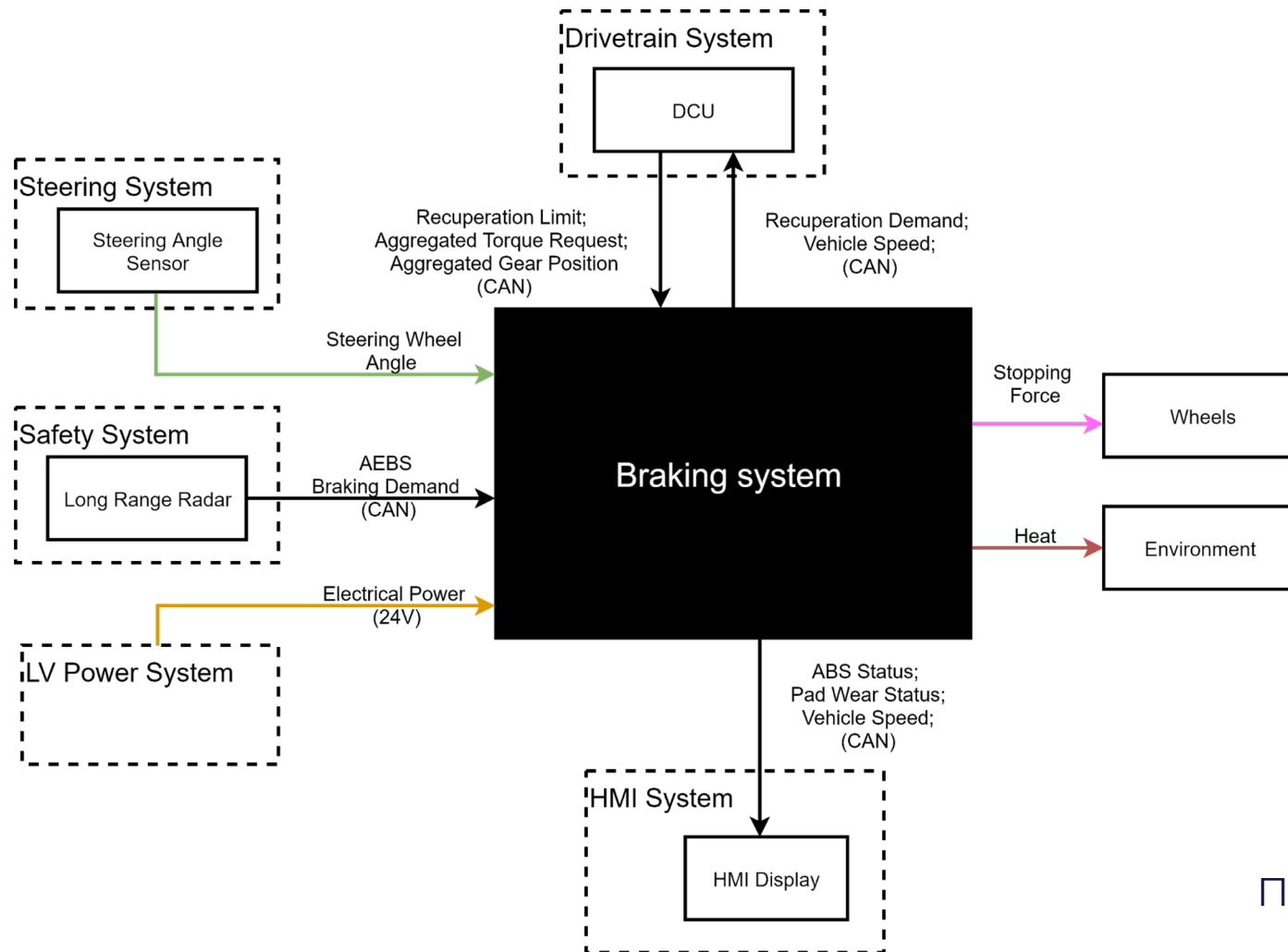
# Какую проектную работу мы выполняем?

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- Определение системы (требования и архитектура)
- Анализ опасностей/угроз и оценка рисков
- Определение целей безопасности и кибербезопасности SIL/ASIL/CAL/PL
- Функциональная и техническая концепция безопасности
- Анализ безопасности и кибербезопасности (Анализ видов и последствий отказов, Дерево неисправностей, Дерево угроз)
- Определение и разработка механизмов безопасности и мер защиты (LOPA, Bowtie)
- Программная и аппаратная архитектура и требования по механизмам безопасности
- Анализ надежности и оценка метрик безопасности, FMEDA
- Активное участие в верификации и испытаниях систем безопасности с разработкой плана и методик испытаний
- Работа с безопасностью систем на этапах производства, эксплуатации, ТО, сервиса и списания



# Примеры проектных работ

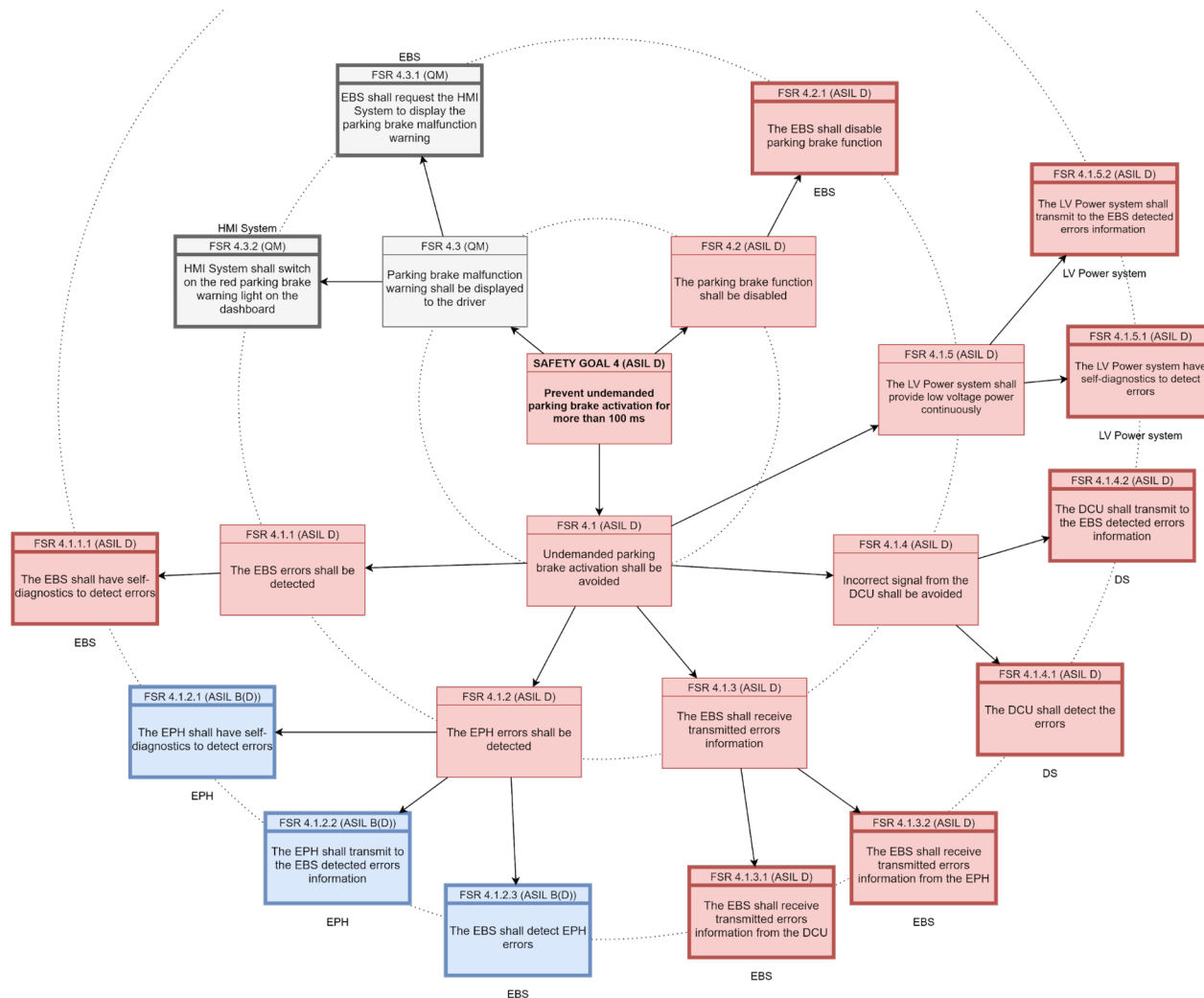


Пример интерфейсной диаграммы системы

# Примеры проектных работ

Ref No.	Hazardous Event			Exposure			Rationale for selected E value	Sequence of events leading to	Severity Rationale	Sev. rating	Controllability Rationale	Contr.	ASIL	SG Linking
	Vehicle Level	OS ID	Operational Situation	Duration	Frequency	Chosen E								
RA1	Loss of braking	OS1	The vehicle moves in an urban environment and approaches a controlled junction / pedestrian crossing at a city speed	E4	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle approaches a control junction. Risk of front collision with crossing traffic participants who drives on allowed traffic light signal at a city speed	Front collision with an ahead moving vehicle at city speed, or hitting pedestrian at a crossing, or side collision with the crossing traffic, S3	S3	Drivers may try to change their target path. Less than 90% of the average drivers be able to avoid harm by changing their target path. C3	C3	D	SG1
RA2	Loss of braking	OS2	The vehicle moves in an urban environment and approaches an uncontrolled junction / pedestrian crossing at a city speed	E4	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle approaches an uncontrolled junction. Risk of front collision with crossing traffic participants at a city speed	Front collision with an ahead moving vehicle at city speed, or hitting pedestrian at a crossing, or side collision with the crossing traffic, S3	S3	Drivers may try to change their target path. Less than 90% of the average drivers be able to avoid harm by changing their target path. C3	C3	D	SG1
RA3	Loss of braking	OS3	The vehicle moves in an urban environment and approaches a controlled junction at a city speed and want to turn to right or left side	E4	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle approaches a controlled junction and intends to turn. Risk of unintended vehicle lateral motion and collision with crossing traffic participants at a city speed.	Side collision with an opposite traffic at a city speed, or hitting pedestrians on the ahead crossing, S3	S3	Uncontrollable by drivers. Less than 90% of the average drivers be able to avoid harm by changing their target path. C3	C3	D	SG1
RA4	Loss of braking	OS4	The vehicle moves in an urban environment and approaches an uncontrolled junction at a city speed and want to turn to right or left side	E4	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle approaches an uncontrolled junction and intends to turn. Risk of unintended vehicle lateral motion and collision with crossing traffic participants at a city speed.	Side collision with an opposite traffic at a city speed, or hitting pedestrians on the ahead crossing, S3	S3	Uncontrollable by drivers. Less than 90% of the average drivers be able to avoid harm by changing their target path. C3	C3	D	SG1
RA5	Loss of braking	OS6	The vehicle approaches a parking area	E2	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when the vehicle approaches a parking area. Risk of collision with other traffic participants and pedestrians at a very low speed	Front collision at a very low speed, S1	S1	It is hard to avoid the collision as only steering available. C3	C3	B	SG1
RA6	Loss of braking	OS8	The vehicle moves in an urban environment at a city speed and approaches an obstacle or a car that is braking	E3	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle approaches a braking vehicle on an urban road. Risk of collision with the braking vehicle at a city speed	Front collision with braking vehicle at a city speed, S3	S3	Less than 90% of the average drivers be able to avoid harm by changing their target path due to high-density traffic in an urban environment. C3	C3	D	SG1
RA7	Loss of braking	OS11	The vehicle moves on a highway at a highway speed and approaches an obstacle or a car that is braking	E3	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle approaches a braking vehicle on a highway at a high-density traffic. Risk of collision with the braking vehicle at a highway speed	Front collision with braking vehicle at a highway speed, S3	S3	Less than 90% of the average drivers be able to avoid harm by changing their target path due to high-density traffic. C3	C3	D	SG1
RA8	Loss of braking	OS17	The vehicle exits a highway	E2	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle exits a highway. Risk of front/rear collision with other vehicles and stationary objects at a highway speed	Front collision with vehicles and stationary objects at a highway speed, S3	S3	Uncontrollable by drivers. Less than 90% of the average drivers be able to avoid harm. C3	C3	D	SG1
RA9	Loss of braking	OS19	The vehicle moves on a wet normal road and the driver fully presses a brake pedal (to the floor) that is a hard brake-locking	E2	E2	E2	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when the driver fully presses a brake pedal during a wet normal road driving. Risk of front collision with other traffic participants at a medium speed	Front collision at a medium speed, S3	S3	Uncontrollable by drivers. Less than 90% of the average drivers be able to avoid harm. C3	C3	B	SG1
RA10	Loss of braking	OS21	The vehicle moves on a normal straight road and the front collision threat is detected (EMERGENCY BRAKING)	E2	E2	E2	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when the front collision threat is detected on a normal road driving. Risk of collision with unexpected obstacle at the medium speed	Front collision with obstacle in a normal road at a medium speed, S3	S3	Uncontrollable by drivers. Less than 90% of the average drivers be able to avoid harm. C3	C3	B	SG1
RA11	Loss of braking	OS22	The vehicle is stopped at a traffic light on a mild gradient urban road (uphill)	E2	E3	E3	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle is stopped at a traffic light on urban mild gradient road (uphill). Risk of rear collision with other vehicles at a very low speed.	Rear collision with a vehicle behind at a low speed, S2	S2	The driver may not notice the rolling of the vehicle. Less than 90% of the average drivers be able to avoid harm by pressing the brake pedal or acceleration pedal. C3	C3	B	SG1
RA12	Loss of braking	OS23	The vehicle is stopped at a traffic light on a mild gradient urban road (downhill)	E2	E3	E3	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation a loss of braking is frequency and duration dependent braking process	Loss of braking occurs when vehicle is stopped at a traffic light on urban mild gradient road (downhill). Risk of front collision with other vehicles at a low speed.	Front collision at a low speed, S2	S2	More than 99% of the average drivers are able to avoid harm by pressing the brake pedal. C1	C3	B	SG1
RA13	Excessive braking	OS1	The vehicle moves in an urban environment and approaches a controlled junction / pedestrian crossing at a city speed	E4	E4	E4	We choose a maximum from exposure by duration and exposure by frequency because in this operational situation an excessive braking is frequency and duration dependent braking process	Excessive braking occurs when vehicle approaches a control junction. Risk of rear collision with vehicle that drives behind at a city speed	Rear collision at a city speed, S3	S3	The driver behind can manage the situation by keeping a distance and applying brakes quickly. C2	C2	C	SG2

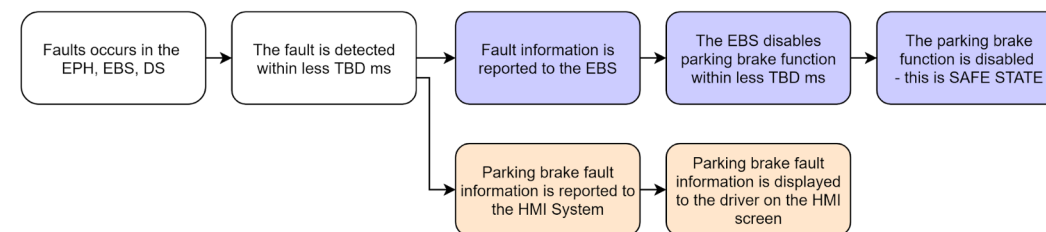
# Примеры проектных работ



Degradation concept

Warning concept

TBD - to be determined  
DS - Drivetrain system



Пример функциональной концепции безопасности

# Цены на наши услуги

Дешевле в пакете

## Разовая консультация

₽ 8500

за консультационный час

- ✓ Первая консультация для вас абсолютно бесплатно
- ✓ Удобная опция при если требуются единичные работы
- ✓ Все консультации могут быть записаны вами с целью дальнейшего использования

## Пакет консультаций

₽ 5000

за час проектных работ

- ✓ Размер минимального пакета услуг - 10 часов
- ✓ Пакет действителен 30 суток начиная со дня покупки
- ✓ Часы внутри пакета могут быть использованы для оплаты консультаций или иных услуг

## Тренинги и обучение

₽ 16500

за человека в день

- ✓ Скидки для корпоративных клиентов и большой групп
- ✓ Содержимое тренинга можно гибко поменять под вас
- ✓ Группы до 12 человек для обеспечения лучшей эффективности обучения

# Всегда на связи

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SafetyConsult поможем вам разобраться в вопросах безопасности, надежности и системной инженерии, добиться существенных результатов в этих областях знаний, а также поможет минимизировать время и ресурсы, затрачиваемые на каждый проект!

Переходите на наш сайт [safetyconsult.tech](https://safetyconsult.tech) или напишите нам на нашу почту [consulting@safetyconsult.tech](mailto:consulting@safetyconsult.tech) чтобы узнать больше о безопасности и нашей компании

**[Забронировать бесплатный звонок прямо сейчас](#)**