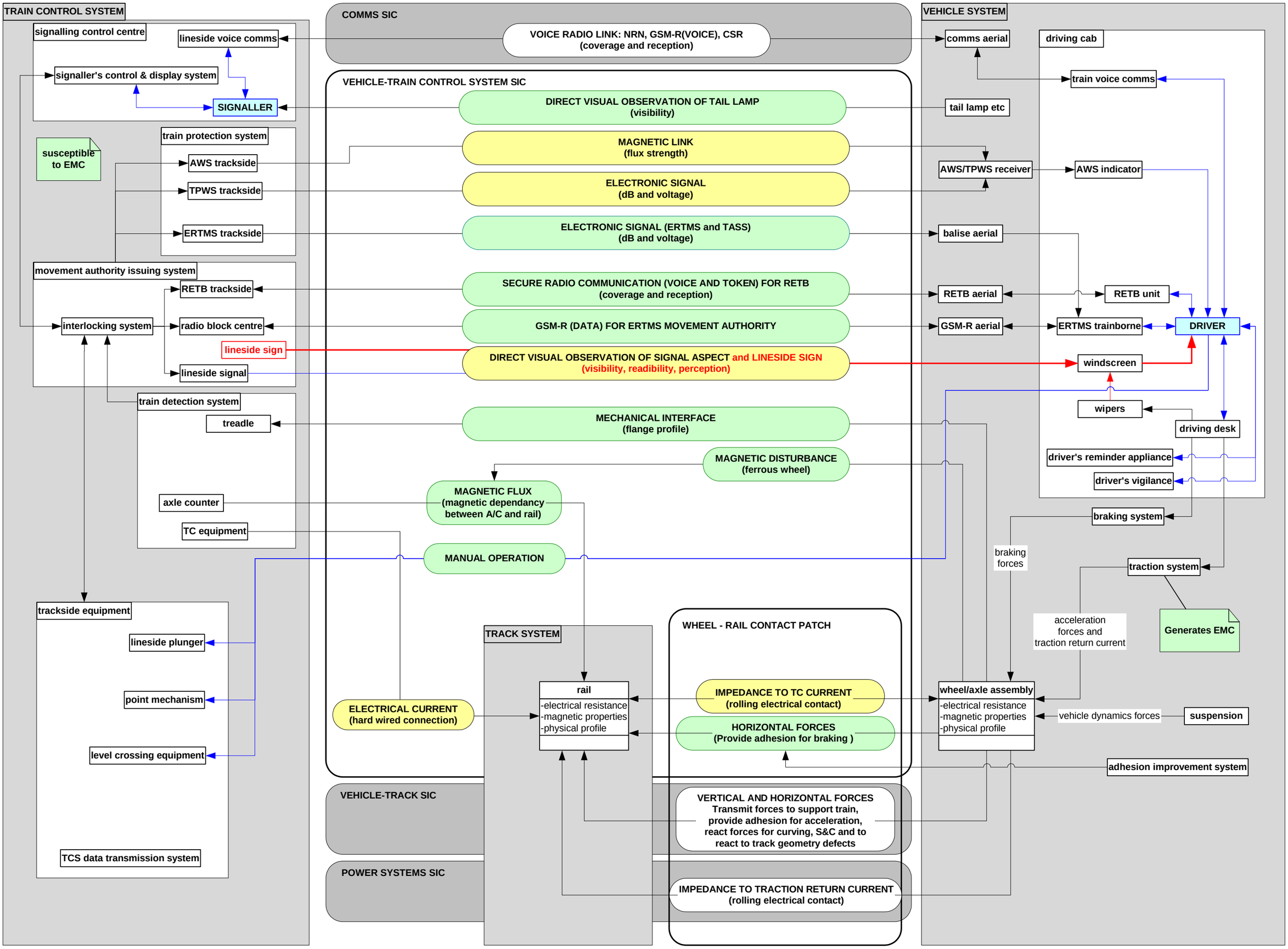
TRAIN CONTROL SYSTEM
signalling control centre
lineside voice comms
signaller's control & display system
SIGNALLER
susceptible to EMC
train protection system
AWS trackside
TPWS trackside
ERTMS trackside
movement authority issuing system
RETB trackside
interlocking system
radio block centre
lineside sign
lineside signal
train detection system
treadle
axle counter
TC equipment
trackside equipment
lineside plunger
point mechanism
level crossing equipment
TCS data transmission system
COMMS SIC
VOICE RADIO LINK: NRN, GSM-R(VOICE), CSR
(coverage and reception)
VEHICLE-TRAIN CONTROL SYSTEM SIC
DIRECT VISUAL OBSERVATION OF TAIL LAMP
(visibility)
MAGNETIC LINK
(flux strength)
ELECTRONIC SIGNAL
(dB and voltage)
ELECTRONIC SIGNAL (ERTMS and TASS)
(dB and voltage)
SECURE RADIO COMMUNICATION (VOICE AND TOKEN) FOR RETB
(coverage and reception)
GSM-R (DATA) FOR ERTMS MOVEMENT AUTHORITY
DIRECT VISUAL OBSERVATION OF SIGNAL ASPECT and LINESIDE SIGN
(visibility, readibility, perception)
MECHANICAL INTERFACE
(flange profile)
MAGNETIC DISTURBANCE
(ferrous wheel)
MAGNETIC FLUX
(magnetic dependancy
between A/C and rail)
MANUAL OPERATION
ELECTRICAL CURRENT
(hard wired connection)
TRACK SYSTEM
rail
-electrical resistance
-magnetic properties
-physical profile
WHEEL - RAIL CONTACT PATCH
IMPEDANCE TO TC CURRENT
(rolling electrical contact)
HORIZONTAL FORCES
(Provide adhesion for braking)
VEHICLE-TRACK SIC
VERTICAL AND HORIZONTAL FORCES
Transmit forces to support train,
provide adhesion for acceleration,
react forces for curving, S&C and to
react to track geometry defects
POWER SYSTEMS SIC
IMPEDANCE TO TRACTION RETURN CURRENT
(rolling electrical contact)
VEHICLE SYSTEM
comms aerial
driving cab
train voice comms
tail lamp etc
AWS/TPWS receiver
AWS indicator
balise aerial
RETB aerial
RETB unit
GSM-R aerial
ERTMS trainborne
DRIVER
windscreen
wipers
driving desk
driver's reminder appliance
driver's vigilance
braking system
braking forces
traction system
Generates EMC
acceleration forces and traction return current
wheel/axle assembly
-electrical resistance
-magnetic properties
-physical profile
vehicle dynamics forces
suspension
adhesion improvement system