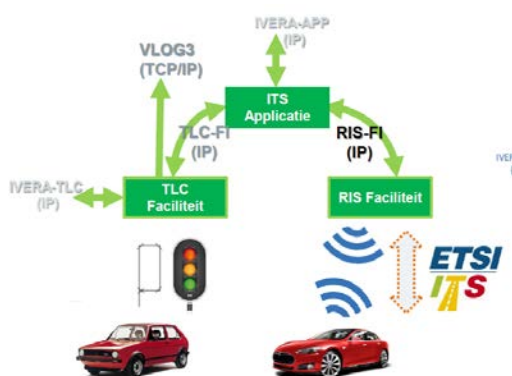


# Intelligente Verkeers Regel Installatie (iVRI) – Fase 1

## Deliverable G3: IRSIDD IVERA4.0

Interface Requirements Specification IVERA4.0  
Interface Definition Design IVERA4.0



Datum: 28 januari 2016  
Versie: 1.2

## VOORWOORD

In juni 2015 is opdracht verstrekt door het Ministerie van Infrastructuur en Milieu via het Beter Benutten Vervolg (BBV) programma aan vier VRA leveranciers om te komen tot een gezamenlijke definitie van VRA standaarden ten behoeve van connected en coöperatieve functionaliteit.

Dit document vormt Deliverable G3 van de afgesproken leverdelen in de opdrachtverstrekking, omschreven als "IRSIDD IVERA".

Deze deliverable beschrijft in het Engels de wijzigingen van het koppelvlak IVERA tussen een iTLC en een beheercentrale.

Dit document is tot stand gekomen door samenwerking van de vier leveranciers in de werkgroep bestaande uit:

Inge Fløan



Hans Looijen



Peter Smit



Jeroen Hiddink



*NB. De rest van dit document is geschreven in het Engels om internationale uitwisseling te ondersteunen.*

The rest of this deliverable has been written in English to facilitate international exchange.

## DOCUMENT CONTROL SHEET

### Document versions:

Version	Date	Author	Comment
0.1	2015-10-01	WG3	Initial version
1.0	2015-12-14	WG3	Initial Draft
1.1	2016-01-20	WG3	Final Draft
1.2	2016-01-28	WG3	Final Draft

### Approval:

	Who	Date	Version
Prepared			
Reviewed			
Approved			

**Publication level:** Public

**Version filename:** Del. G3 - IRSIDD iTLC Ivera4.00 v1.2.docx

## CONTENT

<b>1</b>	<b>Introduction</b>	<b>5</b>
1.1	System Overview	5
1.2	Document overview	5
1.2.1	<i>Purpose and scope</i>	5
1.2.2	<i>Document structure</i>	5
1.3	Reader advise	6
<b>2</b>	<b>References</b>	<b>7</b>
2.1	Normative	7
2.2	Informative	7
<b>3</b>	<b>Acronyms, abbreviations and concepts</b>	<b>8</b>
<b>4</b>	<b>Requirements</b>	<b>9</b>
4.1	Introduction	9
4.1.1	<i>Requirement notation format</i>	9
4.2	General requirements	9
4.3	Management Interface ITS Application	9
4.4	Management Interface TLC Facilities	10
4.5	IVERA objects	11
4.6	IVERA connections	17
4.6.1	<i>Master to Slave (object management)</i>	17
4.6.2	<i>Slave to Master (event- and logbook handling)</i>	17
4.7	TLC-FI User management	18
4.8	ITS Application session state	18
<b>5</b>	<b>Detailed design</b>	<b>19</b>
5.1	General	19
5.2	Management Interface ITS Application	19
5.2.1	<i>Object APPID.I</i>	19
5.2.2	<i>Object APPID</i>	19
5.2.3	<i>Object APPVER.I</i>	20
5.2.4	<i>Object APPVER</i>	20
5.2.5	<i>Object APPFOUT.I</i>	21
5.2.6	<i>Object APPFOUT</i>	21
5.2.7	<i>Object APP.LA</i>	22
5.2.8	<i>Object APP.LB</i>	22
5.2.9	<i>Object APP.A</i>	22
5.3	Management Interface TLC Facilities	23
5.3.1	<i>Object APPLOC</i>	23
5.4	IVERA connections	24
5.5	Master to Slave (object management)	24
5.6	Slave to Master (event- and logbook handling)	24
5.7	TLC-FI User management	25
5.7.1	<i>Object APPUSER.I</i>	25
5.7.2	<i>Object APPPASS</i>	26
5.7.3	<i>Object APPGROEP</i>	27
5.8	ITS Application session state	28
5.8.1	<i>Object APPSTAT</i>	28

# 1 Introduction

## 1.1 System Overview

This section describes the high-level view of the functional blocks of the iTLC with IVERA interfaces.

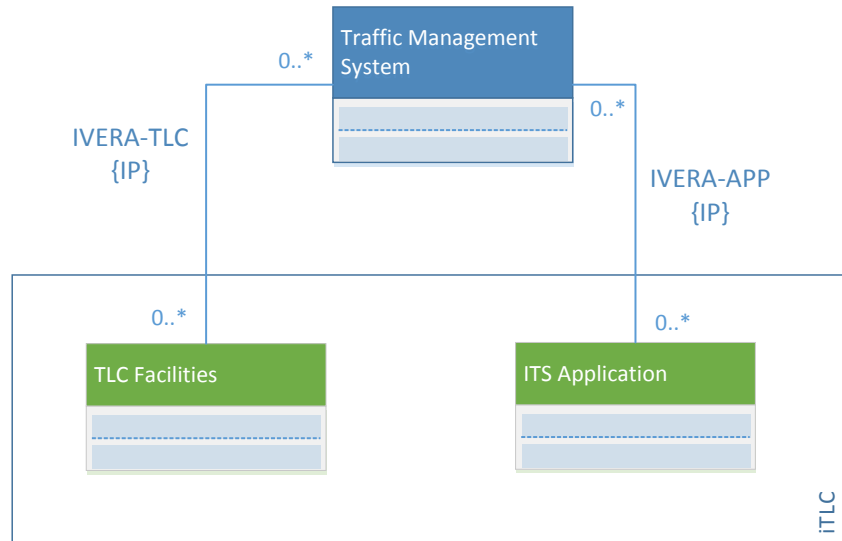


Figure 1 Functional model

In Figure 1 the IVERA-APP and IVERA-TLC connections enables the Traffic Management System (TMS) to manage the ITS Applications and the TLC Facilities.

The TLC Facilities act as an IVERA slave and each ITS Application may act as an IVERA slave. Each of these IVERA slaves provides an IVERA interface with their own set of IVERA objects.

*Example: 2 ITS Control applications both will have an object with max green time (TMG). They belong to different entities so have independent values.*

The IVERA protocol describes a single mechanism to communicate with any IVERA slave.

## 1.2 Document overview

### 1.2.1 Purpose and scope

This document describes proposed changes of the IVERA interface of an Intelligent TLC (iTLC). Only the changes with respect to the IVERA version 3.01 are described and will result in IVERA version 4.

This document contains the IRS and IDD of the interfaces IVERA-APP and IVERA-TLC.

### 1.2.2 Document structure

Chapter 1 contains introduction

Chapter 2 contains references to normative and informative documents

Chapter 3 explains acronyms and concepts.

Chapter 4 contains interface requirements specification.

Chapter 5 describes to proposed interface design.

---

### **1.3 Reader advise**

Knowledge of the following documents is assumed:

- IVERA Functionele specificatie (versie 3.01)
- IVERA Objectdefinitie Verkeersregelinstallaties (versie 3.01)
- IVERA Technische specificatie (versie 3.01)
- Beter Benutten Vervolg, project iVRI, Deliverable F, iTLC Architecture (V1.2)

---

## 2 References

### 2.1 Normative

ID	Reference
[Ref 1]	Beter Benutten Vervolg, project iVRI, Deliverable F, iTLC Architecture (V1.2)
[Ref 2]	Bijlage 1 Plan van Aanpak.pdf, 18 mei 2015, definitief t.b.v. DO BBV 26/5/2015
[Ref 3]	IVERA Functionele specificatie (versie 3.01)
[Ref 4]	IVERA Objectdefinitie Verkeersregelininstallaties (versie 3.01)
[Ref 5]	IVERA Technische specificatie (versie 3.01)

### 2.2 Informative

ID	Reference
[Ref 6]	---

---

### 3 Acronyms, abbreviations and concepts

#### Acronyms and abbreviations

IRS	Interface Requirements Specification
IDD	Interface Design Description
ITS	Intelligent Transport Systems
IVERA	Management protocol for traffic light controllers in the Netherlands
TLC	Traffic Light Controller
TLC-FI	TLC Facilities Interface
iTLC	Intelligent TLC performing traffic light controller functions and allowing for ITS applications
TMS	Traffic Management System

#### Concepts

TLC middleware	The internal software of an iTLC delivered by the manufacturer. Amongst others responsible for translating requested signal group states to actual hardware outputs. Access to TLC-Middleware is provided by the TLC Facilities.
Traffic control application	The software using the TLC-Facilities that implements the traffic flow regulation. Based on traffic detection information it sends to the TLC middleware the desired signal group states.
Signal group	Traffic signs for one driving direction.
ITS Application	An application which implements one or more ITS use-cases. Range of possible ITS Applications include a "traffic control application".
IVERA slave	Provides an interface which can be used by IVERA masters to obtain or change IVERA objects. An IVERA slave reports event notifications automatically to an IVERA master.
IVERA master	Uses IVERA slaves to read or change IVERA objects. May provide also an interface onto which IVERA slaves can report event-notifications.



---

## 4 Requirements

### 4.1 Introduction

This chapter contains requirements of the IVERA-APP and IVERA-TLC interfaces.

#### 4.1.1 Requirement notation format

The following format is used to define a requirement:

Req-ID	IRS-xx-yyyy
Title	
Description	
Source	
Comment	

- Req-ID: unique identification of the requirement according to the following format: 'IRS-xx-yyyy', where xx is an identifier for the interface, yyyy is a number of the requirement
- Title: a short description of the requirement
- Description: formal and detailed description of the requirement.
- Source: reference to a source document used as input for the requirement.
- Comment: clarification of the requirement.

### 4.2 General requirements

The following are general requirements are applicable to the IVERA interface of an iTLC.

Req-ID	IRS-IVERA-01
Title	Compatibility
Description	IVERA protocol must be backwards compatible by using the same protocol syntax.
Source	[Ref 3] chapter 4
Comment	

Req-ID	IRS-IVERA-02
Title	Compatibility
Description	Changes needed to existing IVERA masters should be as minimal as possible.
Source	
Comment	Existing IVERA masters should be able to communicate with iTLC's by using IVERA.

### 4.3 Management Interface ITS Application

This section describes requirements of the management interface of ITS Applications, known as IVERA-APP.

Req-ID	IRS-IVERA-03
Title	Accessibility
Description	An ITS Application using the TLC as part of an iTLC may provide an IVERA-APP interface.
Source	[Ref 1] Chapter 6.1
Comment	Typically traffic control applications implements IVERA-APP.

Not all objects from the table in section 4.5 are mandatory for the IVERA-APP. Objects are related to the type and/or implementation of an ITS Application. For example, CCOL and RWS-C have different usage of IVERA objects. Because other types of ITS applications may also implement the IVERA-APP, objects are only applicable if it is applicable for the used ITS application.

It is not mandatory to have an IVERA-APP interface, it can be replaced by another management interface.

Req-ID	IRS-IVERA-04
Title	Available objects
Description	The IVERA-APP interface provides access to at least all mandatory IVERA Objects as listed in section 4.5, column "IVERA-APP".
Source	[Ref 1] Chapter 6.1
Comment	Mandatory objects are defined for CCOL and RWS-C, this means that for other types of ITS Applications only the protocol objects (marked with P) are mandatory.

#### 4.4 Management Interface TLC Facilities

This section describes requirements of the management interface of the TLC, known as IVERA-TLC.

Req-ID	IRS-IVERA-05
Title	Accessibility
Description	The TLC-Facilities always provides an IVERA-TLC interface.
Source	[Ref 1] Chapter 6.1
Comment	

Req-ID	IRS-IVERA-06
Title	Mandatory objects
Description	The IVERA-TLC interface provides access to at least all mandatory IVERA Objects as listed in section 4.5, column "IVERA-TLC".
Source	[Ref 1] Chapter 6.1
Comment	

Req-ID	IRS-IVERA-07
Title	ITS Application identification and location

Description	The IVERA-TLC interface must provide information (via IVERA TLC objects) of the ITS Applications that may interact with the iTLC. This information must at least contain the following: <ul style="list-style-type: none"> <li>• ITS Application id</li> <li>• ITS Application role with the TLC Facilities Interface (TLC-FI)</li> <li>• IP address at which the ITS Application can be accessed</li> <li>• TCP port number at which the ITS Application provides the IVERA-APP interface (if supported by the application)</li> </ul>
Source	[Ref 1] Chapter 6.1
Comment	With this information, a TMS can determine where it can access the IVERA-APP interfaces of ITS Applications connected to the TLC.

#### 4.5 IVERA objects

The IVERA-protocol describes access to IVERA objects. Some objects are related to a traffic control application and other objects are related to the TLC: this is depicted per Object type in the table below.

Some objects are relevant for both TLC as well ITS Applications and should be implemented for both.

To support the iTLC-architecture, new objects are introduced. These are stated at the end of the table and marked as *italic*.

X = object is expected in this interface.

P = object is protocol related.

Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
KTIJD	Kalendertijd		X	
TIJD	Actuele systeemtijd	X	X	
DATUM	Actuele systeemdatum	X	X	
JAAR	Actueel jaar		X	
WEEK	Weeknummer		X	
DAG	Nummer van dag van de week		X	
DAG.I	Index dag van de week		X	
BIJZDAG	Bijzondere dag		X	
WKZB	Weeknummer begin zomertijd		X	
WKZE	Weeknummer einde zomertijd		X	
VRIID	Automaatidentificatie		X	
VRIID.I	Index automaatidentificatie		X	
VRIVER	Versienummers		X	
VRIVER.I	Index versienummers		X	
VRISTAT	Automaat toestand		X	
VRISTAT.I	Index statusbronnen		X	
VRIPROG	Automaat programma		X	
VRISUBPROG	Automaat subprogramma		X	
VRIPROG.I	Index programmabronnen		X	

<sup>1</sup> The description is in Dutch. It is a copy from the specification which is written in Dutch.

Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
VRIPROGLYST	Programmalijsjt.		X	
VRIPROGLYST EXT	Uitgebreide programmalijsjt		X	
BEDRIJF	Bedrijfstoestand m.b.t. de centrale.		X	
BEDRIJF.I	Index object BEDRIJF		X	
FTPUSER.I	FTP-gebruikersnamen	X	X	
FTPPASS	FTP-passwords	X	X	
FTPLOCATION	FTP-locatie	X	X	
VRIFOUT	Actuele foutcode		X	
VRIFOUT.I	Index foutcodes		X	
VRIFSUB	Fout status van subsystemen.		X	
VRIFSUB.I	Index subsystemen.		X	
KLA1	Inschakelen regelen periode 1		X	
KLU1	Uitschakelen regelen periode 1		X	
KLA2	Inschakelen regelen periode 2		X	
KLU2	Uitschakelen regelen periode 2		X	
KLA3	Inschakelen regelen periode 3		X	
KLU3	Uitschakelen regelen periode 3		X	
KLA4	Inschakelen regelen periode 4		X	
KLU4	Uitschakelen regelen periode 4		X	
KLA5	Inschakelen regelen periode 5		X	
KLU5	Uitschakelen regelen periode 5		X	
KLOKPER	Hulpelement klokperiode		X	
KLOKPER.A	Stand klokperiode		X	
KLOKPER.I	Index object KLOKPER		X	
KLOKPROG	Klokperiode programmakeuze		X	
KLOKPROG.A	Stand klokperiode programmakeuze		X	
KLOKPROG.I	Index object KLOKPROG		X	
KLA_AKOEST	Inschakelen akoestische signalen		X	
KLU_AKOEST	Uitschakelen akoestische signalen		X	
KLA_HARD	Inschakelen hoog geluidsvolume		X	
KLU_HARD	Uitschakelen hoog geluidsvolume		X	
CIFGUS	CIF gewenste uitgangssturing	X		
CIFWUS	CIF werkelijk uitgangssturing	X		
CIFIS	CIF ingangsstatus	X		
CIFWPS	CIF werkelijke programmastatus	X		
CIFGPS	CIF gewenste programmastatus	X		
CIFKLOK	CIF kalendertijd	X		
CIFPARAM1	CIF parameter tabel 1	X		
CIFPARAM2	CIF parameter tabel 2	X		
TGOR	Garantieontruimingstijd (appl)	X		
TGOR1	Garantieontruimingstijd (proces)		X	
TOR	Ontruimingstijd (appl)	X		
TGG	Garantiegroentijd (appl)	X		
TGG1	Garantiegroentijd (proces)		X	

Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
TGGL	Garantiegeeltijd (appl)	X		
TGGL1	Garantiegeeltijd (proces)		X	
TMGL	Maximum geeltijd (appl)	X		
TMGL1	Maximum geeltijd (proces)		X	
TGR	Garantieroodtijd (appl)	X		
TGR1	Garantieroodtijd (proces)		X	
TVG	Vastgroentijd	X		
TVAG	Voertuigafhankelijk verlenggroen	X		
TGL	Geeltijd	X		
TMG	Actuele maximumgroentijd	X		
TMG1	Maximumgroentijd 1	X		
TMG2	Maximumgroentijd 2	X		
TMG3	Maximumgroentijd 3	X		
TMG4	Maximumgroentijd 4	X		
TMG5	Maximumgroentijd 5	X		
TMG6	Maximumgroentijd 6	X		
TDH1	Actuele 1e hiaattijd	X		
TDH11	1e hiaattijd periode 1	X		
TDH12	1e hiaattijd periode 2	X		
TDH2	Actuele 2e hiaattijd	X		
TDH21	2e hiaattijd periode 1	X		
TDH22	2e hiaattijd periode 2	X		
TDH	Hiaattijd	X		
TDB	Bezettijd voor aanvraag	X		
TDOG	Bewakingstijd ondergedrag		X	
TDBG	Bewakingstijd bovengedrag		X	
TDFL	Meettijd fluttergedrag		X	
CDFL	Grenswaarde fluttergedrag		X	
TDBP1	Tijd detectiebewaking aan		X	
TDBP2	Tijd detectiebewaking uit		X	
T	Tijdstelling (appl)	X		
T.A	Lopende tijd (appl)	X		
T.I	Index timers (appl)	X		
T.T	Type tijden	X		
C	Counterinstelling (appl)	X		
C.A	Lopende counter (appl)	X		
C.I	Index counters (appl)	X		
C.T	Type counters	X		
P	Parameterinstelling (appl)	X		
P.I	Index parameters (appl)	X		
P.T	Type parameters (appl)	X		
EGGP	EKG parameterinstelling (appl)	X		
EGGP.I	Index EKG parameters (appl)	X		
EGGP.T	Type EKG parameters (appl)	X		
S	Schakelaar (appl)	X		

Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
S.I	Index schakelaars (appl)	X		
S.T	Type schakelaars (appl)	X		
KLB	Klok parameter 1	X		
KLE	Klok parameter 2	X		
KL.I	Index klokparameters	X		
TP	Tijd instelling (proces)		X	
TP.A	Lopende tijd (proces)		X	
TP.I	Index timers (proces)		X	
CP	Counter instelling (proces)	X		
CP.A	Lopende counter (proces)	X		
CP.I	Index counters (proces)	X		
PP	Parameter instelling (proces)	X		
PP.I	Index parameters (proces)	X		
SP	Schakelaar (proces)		X	
SP.I	Index schakelaars (proces)		X	
SGE.A	Signaalgroepstoestand (ext)		X	
SGI.A	Signaalgroepstoestand (int)	X		
TSGE.A	Timer signaalgroepstoestand (ext)		X	
TSGI.A	Timer signaalgroepstoestand (int)	X		
SGE.LB	Signaalgroeplogboek (ext)		X	
SGI.LB	Signaalgroeplogboek (int)	X		
SGE.LA	Signaalgroeplogboek (onb/ext)		X	
SGI.LA	Signaalgroeplogboek (onb/int)	X		
SG.I	Signaalgroepnamen	X	X	
LAMP.I	Index lampnamen		X	
LAMP.A	Actuele lampstatus		X	
LAMPINFO	Lampconfiguratie		X	
D.A	Detectorstoestand		X	
TD.A	Timer bezet/onbezet		X	
SWD	Software detectorschakelaar		X	
D.LB	Detectorlogboek		X	
D.LA	Detectorlogboek (onb)		X	
D.I	Detectornamen		X	
DC.A	Classificatiedetectortoestand		X	
DC.I	Index object DC		X	
U.A	Toestand overige uitgangen		X	
TU.A	Timer uitgangstoestand		X	
U.LB	Uitgangenlogboek		X	
U.LA	Uitgangenlogboek (onb)		X	
U.I	Index overige uitgangen		X	
I.A	Toestand overige ingangen		X	
TI.A	Timer ingangstoestand		X	
SWI	Software inputschakelaar		X	
I.LB	Ingangenlogboek		X	
I.LA	Ingangenlogboek (onb)		X	

Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
I.I	Index overige ingangen		X	
LSGE	Lijndump SG-toestand (ext)		X	
LSGI	Lijndump SG-toestand (int)	X		
LD	Lijndump detector toestand		X	
LI	Lijndump ingangtoestand		X	
LU	Lijndump uitgangtoestand		X	
BL.A	Actueel blok/module/stage	X		
PL.I	Index signaalplannen	X		
PLTXMAX	maximum waarde cyclustijd (*TX_max)	X		
PLTPLON	inschakeltijd signaalplan (*TPL_on)	X		
PLTPLOFF	uitschakeltijd signaalplan (*TPL_off)	X		
PLTXA	parameter vooruitschakelen (*TXA[])	X		
PLTXB	parameter SG[ ] (*TXB[ ])	X		
PLTXC	parameter EWG[ ]/SVG[ ] (*TXC[ ])	X		
PLTXD	parameter EVG[ ]/SMG[ ] (*TXD[ ])	X		
PLTXE	parameter EMG[ ] (*TXE[ ])	X		
VRI.LB	VRI-logboek		X	
VRI.LA	VRI-logboek (onb)		X	
VRI.C	VRI-commando		X	
VRI.A	Actieve storingslijst		X	
PAR.LB	Parameterlogboek	X	X	
PAR.LA	Parameterlogboek (onb).	X	X	
TELINST	Instellingen telprogramma		X	
TELDATA	Data telprogramma		X	
TELMON	Actuele data telprogramma		X	
DATACOM	Instelling datacommunicatie	X	X	
DATACOM.I	Index object Datacom	X	X	
AUTHOG	Gebruikersnamen		X	
AUTHOP	Toegangscodes		X	
LOGINNIVEAU	Nummer gebruikersgroep waaronder ingelogd is.	P	P	
OVDEVICE	OV-devices		X	
OVFILTER	OV-filter		X	
OV.LB	OV-logboek		X	
OV.LA	OV-logboek (onb)		X	
DIMINST.I	Index diminstellingen.		X	
DIMINST	diminstellingen.		X	
DIMMEN.I	Index dimstatus.		X	
DIMMEN.A	dimstatus.		X	
AKOESTISCH.I	Index Status akoestische signalen		X	
AKOESTISCH.A	Status akoestische signalen		X	
AKOESTISCH.F	Foutstatus akoestische signalen		X	
PAKOESTISCH	Parameter akoestische signalen		X	

Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
PAKOESTISCH.I	Index Parameter akoestische signalen		X	
EXTRAINFO.A	Informatieve actuele extra info string.	X	X	
EXTRAINFOEXT	Informatieve toelichting extra info string.	X	X	
EXTRAINFO.I	Index extra info	X	X	
EVENTLYST.I	Eventnummers als tekststring	X	X	
EVENTLYST.INFO	Detailinformatie over het event	X	X	
ERROR.CODE	Foutcode	P	P	
ERROR.INFO	Gedetailleerde beschrijving	P	P	
ERROR.CMD	Het commando waar de error bij hoort	P	P	
NOODSTROOM	Instellingen voor de noodstroom voorziening		X	
NOODSTROOM.A	Actuele toestand noodstroom voorziening		X	
NOODSTROOM.I	Index object noodstroom voorziening		X	
NOODSTROOM.LA	Logboek (onb.) noodstroom voorziening		X	
NOODSTROOM.LB	Logboek (bev.) noodstroom voorziening		X	
ABON	Abonnementsverzoek	P	P	
BB0	Objectlijst type 0	P	P	
BB1	Objectlijst type 1	P	P	
BBA0	Objectlijst + attributen type 0	P	P	
BBA1	Objectlijst + attributen type 1	P	P	
PING	Ping-commando	P	P	
LOGIN	Login-commando	P	P	
TID	Toepassing identificatienummer	X	X	
XID	Automaat identificatienummer	X	X	
YID	Applicatie identificatienummer	X	X	
ZID	Gereserveerd			
APPLOC	<i>Beschrijft per ITS-Applicatie de netwerk-URL (adres &amp; te gebruiken protocol) waar de (regel)applicatie te bereiken is. Also for different protocols like IVERA, http(s), command parser, ssh.</i>		X	X
APPSTAT	<i>Huidige status van de ITS applicatie</i>	X		X
APPUSER.I	<i>Applicatie gebruikersnamen For TLC a list to grant access. For APP a list to gain access.</i>	X	X	X



Name	Description <sup>1</sup>	IVERA-APP	IVERA-TLC	Mandatory
APPPASS	Applicatie wachtwoorden passwords for APPUSER.I	X	X	X
APPID	Identificatie van Applicatie: <ul style="list-style-type: none"> <li>• Producent/leverancier</li> <li>• Omschrijving</li> <li>• Datum</li> </ul>	X		X
APPVER	Versies van de applicatie	X		X
APPGROEP	Applicatie groep Application group for APPUSER.I	X	X	X
APPFOUT	Beschrijft eventuele fouttoestand van de ITS-Applicatie	X		
APP.LA	Logboek met meldingen van ITS- Applicatie (onb)	X		
APP.LB	Logboek met meldingen van ITS- Applicatie	X		
APP.A	Actieve storingslijst	X		

Tabel 4.1 Object allocation

## 4.6 IVERA connections

### 4.6.1 Master to Slave (object management)

The IVERA interface is defined as a TCP/IP socket connection ([Ref 5] chapters 3-5) with a message syntax [Ref 3] chapter 3.8.

The TCP/IP server port to access the IVERA-TLC interface is 5000.

Access to an IVERA-APP interface (also a TCP/IP server port) is slightly different. To be able to connect to different IVERA-APP interfaces (at the same platform or other platforms), the IVERA-object APPLOC is defined for the IVERA-TLC interface. IVERA master can first query this object by using IVERA-TLC interface, and then determine the right connection properties for an ITS Application.

Req-ID	IRS-IVERA-08
Title	IVERA-APP Address and TCP-port
Description	The network address and TCP-port at which an IVERA-APP interface is reachable, must be made available for each ITS Application in the IVERA-TLC interface.
Source	Accessibility, Compatibility
Comment	

### 4.6.2 Slave to Master (event- and logbook handling)

The IVERA TMS listens on TCP port 5001 for receiving messages sent by IVERA slaves, these messages are called 'trigger events'

As specified in IVERA version 3.01, the receiving IVERA TMS will connect with the sending IVERA slave by using the IP-address and default slave port number (5000). To be able to support multiple IVERA slaves on different port numbers, a slightly different mechanism is required.

Req-ID	IRS-IVERA-09
Title	Trigger event with optional port number
Description	IVERA slaves must be able to send a trigger to the default trigger port including an optional port number, to indicate where the slave can be reached
Source	Accessibility, Compatibility
Comment	IVERA 3.01 TLC compatibility: The TLC will not send the optional port number. The TMS will use the default 5000 port to connect to the slave. IVERA 4 Slave compatibility: The slave will send the optional port number. This might lead to parsing problems in IVERA 3.01 version TMS.

#### 4.7 TLC-FI User management

Req-ID	IRS-IVERA-10
Title	User management
Description	It must be possible to add, update and remove users and credentials
Source	[Ref 1] Chapter 8.2
Comment	Users are ITS-applications

Req-ID	IRS-IVERA-11
Title	Application group
Description	It must be possible to add, update and remove group memberships of users
Source	[Ref 1] Chapter 8.2
Comment	

#### 4.8 ITS Application session state

Req-ID	IRS-IVERA-12
Title	Application status
Description	It must be possible to request for the session state of ITS applications
Source	[Ref 1] Chapter 8.2
Comment	Applicable for TLC and ITS Applications

---

## 5 Detailed design

### 5.1 General

See [Ref 3], [Ref 4] and [Ref 5].

### 5.2 Management Interface ITS Application

#### 5.2.1 Object APPID.I

The object APPID.I depicts the index names of application identification:

Attribuut	Type	Object	Omschrijving
N	1	APPID.I	Naam
O	1	Index applicatie identificatie	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	NUMAPPID	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	2	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.1 Object attributen

The object APPID.I contains a number of elements to characterize the application.

#### 5.2.2 Object APPID

The object APPID depicts de application identification:

Attribuut	Type	Object	Omschrijving
N	1	APPID	Naam
O	1	Automaat identificatie	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	NUMAPPID	aantal data-elementen
I	1	APPID.I	Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0		Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	1, ruwe tekst	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.2 Object attributen

### 5.2.3 Object APPVER.I

The object APPVER.I depicts the index names of application versions:

Attribuut	Type	Object	Omschrijving
N	1	APPVER.I	Naam
O	1	Index versienummers	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	NUMAPPVER	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	2	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.3 Object attributen

### 5.2.4 Object APPVER

The object APPVER depicts the application versions:

Attribuut	Type	Object	Omschrijving
N	1	APPVER	Naam
O	1	Versienummers	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	10	aantal data-elementen
I	1	APPVER.I	Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0		Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	1, ruwe tekst	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.4 Object attributen

### 5.2.5 Object APPFOUT.I

The object APPFOUT.I depicts the index names of errorcode ('foutcode'):

Attribuut	Type	Object	Omschrijving
N	1	APPFOUT.I	Naam
O	1	index foutcode	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	2	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	2	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.5 Object attributen

The object VRIFOUT contains two Error codes. The used numbers are the event codes from object APP.LB:

APPFOUT.I		
0	FATAAL	Eerste fatale fout
1	MELDING	Laatste niet fatale fout

Tabel 5.6 Foutcode

### 5.2.6 Object APPFOUT

The object APPFOUT depicts the actual error code:

Attribuut	Type	Object	Omschrijving
N	1	APPFOUT	Naam
O	1	actuele foutcode	Omschrijving
T	1	0	Type
U	0	4444	User Identificatie Control
E	0	2	aantal data-elementen
I	1	APPFOUT.I	Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0		Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	1, getal met eenheid 1	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.7 Object attributen

### 5.2.7 Object APP.LA

The object APP.LA depicts the APP-log (not confirmed):

Attribuut	Type	Object	Omschrijving
N	1	APP.LA	Naam
O	1	APP-logboek (onbevestigd)	Omschrijving
T	1	1	Type
U	0	6666	User Identificatie Control
E	0	0 .. 1000	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0		Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	100	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.8 Object attributen

### 5.2.8 Object APP.LB

The object APP.LB depicts the APP-log:

Attribuut	Type	Object	Omschrijving
N	1	APP.LB	Naam
O	1	APP-logboek	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	0 .. 1000	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0		Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	100	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.9 Object attributen

### 5.2.9 Object APP.A

The object APP.A depicts the actual failing list:

Attribuut	Type	Object	Omschrijving
N	1	APP.A	Naam
O	1	Actieve storingslijst	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	0 .. 150	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0		Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	100	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.10 Object attributen

### 5.3 Management Interface TLC Facilities

#### 5.3.1 Object APPLOC

The object APPLOC contains the network address an ITS Application is reachable.

Attribuut	Type	Object	Omschrijving
N	1	APPLOC	Naam
O	1	Application location	Omschrijving
T	1	1	Type
U	0	6444	User Identificatie Control
L	0		Logboek
W	0		Wijzigingsteller
E	0	NUMAPPLOC	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0	0	Minimum data-elementwaarde
MAX	0	99	Maximum data-elementwaarde
IMIN	1		Index data-element minimumwaarde
IMAX	1		Index data-element maximumwaarde
ITYPE	1		Index data-element type
F	0	TBD	Data-element formaat
S	0		Data-element stapgrootte
A	1		Overzicht alle attributen

Tabel 5.11 Object attributen APPLOC

This object depicts the accessibility data for the ITS applications that might access this TLC. An ITS Application is identified by “programmanummer” and may be listed multiple times for different protocols, addresses and port numbers.

#### Format: network address, type 1

For program / application addressing the next entry definition is used:

ProgramAccessAdress = Programmanummer + komma + [netwerkaddress] + komma + [poort] + komma + [protocol] +komma + [rol]+komma + [omschrijving]

Komma=","

Punt="."

DubbelPunt=":"

Programmanummer = 0..99

Netwerkaddress=IP4 | IP6 | hostnaam

IP4= IPOctet + Punt + IPOctet + Punt + IPOctet + Punt + IPOctet

IPOctet = 0..255

IP6= IPHextet+ DubbelPunt+ IPHextet+ DubbelPunt+ IPHextet+ DubbelPunt+ IPHextet

IPHextet = 0..FFFF /\* 16 bits getal in hexdecimale notatie \*/

Hostnaam= HostnaamLabel{. HostnaamLabel }

HostnaamLabel={a..z|A..Z|0..9|\_”-”}

Poort = 0..65535

Protocol= {"IVERA-APP"|"TERMINAL"|"VLOG"|"http"|"https"|"ftp"|"ftps"|"ssh"|AsciiString}

Rol= {"Control"|"Provider"|"Consumer"}

Omschrijving = AsciiString

Examples:

1, 10.10.39.40,5002,IVERA-APP, Control,Regelapplicatie spits

1, 10.10.39.40,9000,TERMINAL, Control, Regelapplicatie spits

1, 10.10.39.40,9001,VLOG, Control, Regelapplicatie spits

8, 10.10.40.10,80,http, Provider, OV prioriteitsappl

9, 10.10.41.19,,,, Consumer, Snelheidsadviesapplicatie

---

## 5.4 IVERA connections

### 5.5 Master to Slave (object management)

### 5.6 Slave to Master (event- and logbook handling)

The IVERA message is extended with a field 'IveraPort' which may be used by IVERA slave to indicate the TCP-port on which the IVERA-APP of the reporting IVERA slave is reachable. In more detail 'Berichtslave' definition is extended with 'BerichtSlaveTriggerPoort'.

This extension should be used to inform the master about the port number the on which the slave can be reached.

The sequence will be:

- Slave connects to trigger port on master.
- Slave sends first message containing 'BerichtSlaveTriggerPoort'
- The next message(s) contain(s) 'BerichtSlaveTrigger'
- The slave disconnects.
- Master takes appropriate actions to follow up trigger message. (e.g. requesting logbook objects using the received Ivera port number.)

The definition of 'Bericht' will become as below. (Changes are in *Italic*)

```
Bericht = [BerichtID] (BerichtMaster | BerichtSlave) CarriageReturn
BerichtID = "@" PosIntegerWaarde "#"
BerichtMaster = ObjectRef [ "=" ArgumentLijst ]
BerichtSlave = BerichtSlaveErr | BerichtSlaveAck | BerichtSlaveAntw |
  BerichtSlaveAckHand | BerichtSlaveAntwHand | BerichtSlaveTrigger |
  BerichtSlaveTriggerPoort
BerichtSlaveErr = ":E=" SlaveErrCode
BerichtSlaveAck = ":A"
BerichtSlaveAntw = "=" ArgumentLijst
BerichtSlaveAckHand = ObjectRef "=" ArgumentLijst
BerichtSlaveAntwHand = ObjectRef "=" ArgumentLijst
BerichtSlaveTrigger = ":T=" TriggerCode
BerichtSlaveTriggerPoort = ":P=" IveraPort
TriggerCode = PosIntegerWaarde
IveraPort = PosIntegerWaarde
SlaveErrCode = "0" | "1" | "10" | "11" | "12" | "13" | "14" | "15" | "16" | "17" | "18" | "19"
CarriageReturn = Karakter code 13 decimaal
ObjectRef = ObjectNaam [ ":" AttribuutNaam ] | ( [ "/" ElementBereik { "," ElementBereik } ] )
ElementBereik = "*" | Bereik
Bereik = Element [ "-" [ Element ] ]
Element = ("#" PosIntegerWaarde) | IndexNaam
IndexNaam = Eletter { Eletter | "_" }
ArgumentLijst = Argument { "," Argument }
Argument = IntegerWaarde | TekstString
TekstString = DubbelQuote { DetailString } DubbelQuote
```



---

## 5.7 TLC-FI User management

### 5.7.1 Object APPUSER.I

Application usernames are used by applications to authenticate themselves by the TLC. The object APPUSER.I depicts the application-usernames:

Attribuut	Type	Object	Omschrijving
N	1	APPUSER.I	Naam
O	1	Applicatie-gebruikersnamen	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	20	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	2	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.12 Object attributen APPUSER.I

#### Formaat: Indexnaam (2), type 1

Een index object bevat de functionele namen voor de elementen van andere objecten. Een indexnaam mag alleen letters, cijfers en underscores bevatten (zie BNF definitie in functionele specificatie).

To create initial access credentials APPUSER.I/#0 is always "ADMIN". This user is intended to manage other users. Other APPUSER.I unused elements are filled with NU## where ## is replaced with the element number.

## 5.7.2 Object APPASS

IVERA Object APPASS can be used to manage user permissions:

Attribuut	Type	Object	Omschrijving
N	1	APPASS	Naam
O	1	Applicatie-passwords	Omschrijving
T	1	1	Type
U	0	6444	User Identificatie Control
E	0	20	aantal data-elementen
I	1	APPUSER.I	Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	TBD	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.13 Object attributen APPASS

### Format: Instellen gebruikersnaam/toegangscode (TBD), type 1

For changing the application password the next format is used:

Reading the object APPASS results in an empty string.

To change a password the next format will be used:

```
APPASS/<element>="<applicatie-gebruikersnaam>,<password>[,<nieuw1>,<nieuw2>[,<groep>]]"
```

waarbij:

<element> : objectelement (index nummer of een gebruikersnaam uit APPUSER.I) welke wordt aangepast

<gebruikersnaam> : gebruikersnaam uit APPUSER.I (ADMIN gebruiker kan ieder paswoord aanpassen of gebruiker kan eigen paswoord aanpassen.)

<password> : huidige password van gebruikersnaam.

<nieuw1> : nieuw password voor deze gebruiker.

<nieuw2> : moet overeenkomen met <nieuw1>.

<groep> : de groep waartoe deze gebruiker gaat behoren. (ADMIN|CONTROL|PROVIDER|CONSUMER)

This way an admin user and the user self is able to change the password.

For an admin user it is also possible to change usernames and group or to delete a user.

To create a user, a full entry including <groep> needs to be applied. APPUSER.I and APPGROEP will be changed accordingly.

To delete a user, the smallest entry without <nieuw1>,<nieuw2>,<groep> needs to be applied. APPUSER.I and APPGROEP will be changed accordingly

---

### 5.7.3 Object APPGROEP

The object APPGROEP depicts the group a user belongs:

Attribuut	Type	Object	Omschrijving
N	1	APPGROEP	Naam
O	1	Applicatie-groep	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	20	aantal data-elementen
I	1	APPUSER.I	Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	1	Ruwe tekst	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.14 Object attributen APPGROEP

At the moment 5 groups are defined:

ADMIN user to manage users

CONTROL user that connects to TLC-FI that can act as an ITS Control application

PROVIDER user that connects to TLC-FI that can act as an ITS Provider application

CONSUMER user that connects to TLC-FI that can act as an ITS Consumer application

The contents of this object is changed by updating the APPPASS object. Only an ADMIN user is allowed to do this. A user can be locked by an ADMIN user this is useful to stop an ITS Application from attempting to log in. An admin user can unlock a user by writing the user credentials.

---

## 5.8 ITS Application session state

### 5.8.1 Object APPSTAT

The object APPSTAT depicts the application state:

Attribuut	Type	Object	Omschrijving
N	1	APPSTAT	Naam
O	1	Applicatie-status	Omschrijving
T	1	1	Type
U	0	4444	User Identificatie Control
E	0	1/ NUMAPPLOC	aantal data-elementen
I	1		Index verwijzing per dimensie
MIN	0		Minimum data-elementwaarde
MAX	0	MAX_FLEN	Maximum data-elementwaarde
ITYPE	1		Index data-element type
F	0	1 ruwe tekst	Data-element formaat
S	0		Data-element stapgrootte

Tabel 5.15 Object attributen APPSTAT

This object depicts the current state of the application. The possible values depends on the type of the application.

CONTROL: Not Connected, Connected, Ready to control, In control

PROVIDER,CONSUMER: Not Connected, Connected

For IVERA-APP this object has one element providing its own the session state.

For IVERA-TLC this object has NUMAPPLOC elements providing the session state of currently known applications.