Clever Devices

Scope of Work
to
Gainesville Regional Transit System (RTS)
for
ITS System Migration

August 12, 2019
Update: February 10, 2020
Update: April 15, 2020
Update: April 21, 2020

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CLEVER DEVICES' TRADEMARKS

Clever Devices®
AVM®
BusLink®
BusLink Switch®
BusTime®
BusTools®
BusWare™
CleverAnalytics®
CleverCAD®
CleverCare®
CleverCERT®
CleverCounter™
CleverReports®
CleverWare™
CleverWorks®
GH7™
GreyHawk 7™
IncidentAnalytics™
Incident Management™
IdleMonitor®
Intelligent Vehicle Network®
IVN®
Mtram®
M.A.I.O.R.®
PerfectNav™
Seymor®
SpeakEasy®
SmartYard®
TurnWarning®

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1   COVER LETTER

February 10, 2020

Jesus Gomez
Transit Director
Gainesville Regional Transit System (RTS)
34 SE 13th Road
Gainesville, FL 32601

RE: ITS System Migration

Dear Mr. Gomez,

Thank you for the opportunity to continue working with RTS on your technology evolution plan. As an existing technology partner, we strive to help you make the most of your current investments while setting you up for the future. Leveraging your current on-board equipment to mitigate cost, we will migrate you over to Clever Devices' state-of-the-art Intelligent Transportation System (ITS) platform. The following pages are modified from the previous submittal to reflect the recent RTS requests. The products that are included are as follows:

- CleverCAD – CAD/AVL System and Disruption Management with Turn-by-Turn Directions
- CleverReports – Business Intelligence Reporting System
- CleverWorks – Data Management System
- Automated Voice Announcements (AVA)
- BusTime with GTFS-RT – Real-time Passenger Information System
- BusLink – Bulk Data Transfer System
- AVM – Automatic Vehicle Monitoring
- Ridecheck Plus APC reporting and integration to existing UTA APC sensors

In addition to the software listed above, we will install transit control heads and multiband antennas on the 25 buses that don't currently have them, as well as dual cell routers to support passenger wi-fi across the fleet.

Throughout our history with RTS, we have become familiar with the RTS team and your operation. Your Clever Devices project team – Ellen Mullen, Brent Clayton, Tri-Tek (installation subcontractor), and I – will work with RTS to create a mutually agreeable schedule that minimizes any impact on existing operations. Our team will collaborate with you through the entire migration process, which includes a comprehensive training program for your personnel. Our goal is to empower your users through the Clever Devices system so that they can better serve your riders.

If you have any questions, please do not hesitate to contact me via phone at 516-736-0620 or via email at JMcquinn@cleverdevices.com. Thank you for your continued partnership with Clever Devices.

Best Regards,

Johnna McQuinn
Strategic Account Manager
Clever Devices Ltd.

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2   PRICING

2.1   CONFIDENTIAL QUOTATION

ATTN:	Jesus Gomez	DATE:	April 21, 2020
COMPANY:	Gainesville Regional Transit System (RTS)	FAX:	
EMAIL:	gomezjm@cityofgainesville.org	OPP ID #	0063s00000DrINm RevD (OP21917043)
		QR # in CRM	4100
ADDRESS:	34 SE 13th Rd Gainesville, Florida 32601	RE:	ITS System - 2020
PHONE:	352-393-7852		

Clever Devices is pleased to submit the following quotation, subject to the terms and conditions listed below.

Item	Qty	Description	Unit Price	Extended Price
CAD/AVL ITS System				
1	136	ITS System for 136 Fixed Route Vehicles *Hardware (25 Fixed Route Vehicles) Includes:* - Transit Control Head, AVC Microphone, Multiband Antenna, Harness Modification, EA Switch (136 Qty.) *Other Hardware Includes:* - One (1) BiB for Training and Maintenance - 2x Workstations with Dual Display *Software Includes:* - CleverCAD - CAD/AVL System and Disruption Management with Turn By Turn Directions and Text To Speech Software for 1 Language - Clever Reports - BI Reporting System - CleverWorks/RouteTrack/RouteSimulator - Data Management - Automated Voice Annunciation System Information System *Services Includes:* - Software Configuration - Systems Design, Testing, and Training - Installation - Project Management - Integration with Farebox - Year 1 Hardware Warranty and Software Maintenance Included at No Charge	$5,734.00	$779,824.00

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			Subtotal	$779,824.00
			Credit from DR700 Upgrade Project	($28,400.00)
			Total	$751,424.00
CAD/AVL ITS System - Extended Hardware Warranty & Software Maintenance (Year 1-5)				
2	1	Year 1 Telogis Map License Please note that Clever Devices' first year of hardware warranty and software maintenance is included at no charge. This Year 1 Cost is for the Telogis Map License.	$6,179.00	$6,179.00
2	1	ITS System Hardware Warranty & Software Maintenance - Year 2	$42,095.00	$42,095.00
3	1	ITS System Hardware Warranty & Software Maintenance - Year 3	$43,173.00	$43,173.00
4	1	ITS System Hardware Warranty & Software Maintenance - Year 4	$44,282.00	$44,282.00
5	1	ITS System Hardware Warranty & Software Maintenance - Year 5	$45,426.00	$45,426.00
			Subtotal	$181,155.00
BusTime - Real Time Passenger Information System				
6	136	BusTime for 136 Fixed Route Vehicles *Software Includes:* - BusTime and GTFS-RT - Real-time Passenger Information System *Services Includes:* - Software Configuration - Systems Design, Testing, and Training - Project Management - Year 1 Hardware Warranty and Software Maintenance Included at No Charge	$1,074.00	$146,064.00
			Subtotal	$146,064.00
BusTime Extended Hardware Warranty & Software Maintenance (Year 2-5)				
7	1	BusTime Hardware Warranty & Software Maintenance - Year 2	$16,808.00	$16,808.00
8	1	BusTime Hardware Warranty & Software Maintenance - Year 3	$17,312.00	$17,312.00
9	1	BusTime Hardware Warranty & Software Maintenance - Year 4	$17,831.00	$17,831.00
10	1	BusTime Hardware Warranty & Software Maintenance - Year 5	$18,366.00	$18,366.00
			Subtotal	$70,317.00

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Public Wi-Fi Router System				
11	136	Public Wi-Fi Router System for 136 Fixed Route Vehicles *Hardware (136 Fixed Route Vehicles) Includes:* - Digi WR64R Dual Cellular/ Dual Wi-Fi Router - Antennas for public Wi-Fi and Cellular *Services Includes:* - Software Configuration - Systems Design, Testing, and Training - Installation - Project Management - Year 1 Hardware Warranty and Software Maintenance Included at No Charge	$3,436.00	$467,296.00
		Subtotal		$467,296.00
Public Wi-Fi Router System - Extended Hardware Warranty & Software Maintenance (Year 2-5)				
12	1	Public Wi-Fi Router System - Hardware Warranty & Software Maintenance - Year 2	$1,733.00	$1,733.00
13	1	Public Wi-Fi Router System - Hardware Warranty & Software Maintenance - Year 3	$1,785.00	$1,785.00
14	1	Public Wi-Fi Router System - Hardware Warranty & Software Maintenance - Year 4	$13,486.00	$13,486.00
15	1	Public Wi-Fi Router System - Hardware Warranty & Software Maintenance - Year 5	$13,890.00	$13,890.00
		Subtotal		$30,894.00
Automatic Vehicle Monitoring (AVM)				
16	136	AVM System *Includes:* - Software Licenses - System Configuration and Testing - Training - Project Management - Year 1 Software Maintenance Included at No Charge	$2,472.00	$336,192.00
		Subtotal		$336,192.00
AVM - Extended Hardware Warranty & Software Maintenance (Year 2-5)				
17	1	AVM Hardware Warranty & Software Maintenance - Year 2	$8,726.00	$8,726.00
18	1	AVM Hardware Warranty & Software Maintenance - Year 3	$8,988.00	$8,988.00
19	1	AVM Hardware Warranty & Software Maintenance - Year 4	$9,258.00	$9,258.00

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20	1	AVM Hardware Warranty & Software Maintenance - Year 5	$9,536.00	$9,536.00
			Subtotal	$36,508.00

Ridecheck Plus & UTA APC Integration				
21	136	UTA APC Integration & Ridecheck Plus _Includes:_ -Software Licenses - Integration with UTA APC - Incremental Deployment and Training - Year 1 Software Maintenance Included at No Charge	$1,461.00	$198,696.00
			Subtotal	$198,696.00
Ridecheck+ Software Maintenance (Year 2-5)				
22	1	Ridecheck Plus Software Maintenance - Year 2	$16,219.00	$16,219.00
23	1	Ridecheck Plus Software Maintenance - Year 3	$16,705.00	$16,705.00
24	1	Ridecheck Plus Software Maintenance - Year 4	$17,207.00	$17,207.00
25	1	Ridecheck Plus Software Maintenance - Year 5	$17,723.00	$17,723.00
			Subtotal	$67,854.00
Hosting Services Set Up				
26	1	Hosting Set-up and Fees _Includes:_ - One Time set up Fees - Configuration & Testing	$74,520.00	$74,520.00
			Subtotal	$74,520.00
Annual Hosting Services (Year 1-5)				
27	1	Annual Hosting Year 1	$11,762.00	$11,762.00
28	1	Annual Hosting Year 2	$11,762.00	$11,762.00
29	1	Annual Hosting Year 3	$11,762.00	$11,762.00
30	1	Annual Hosting Year 4	$11,762.00	$11,762.00
31	1	Annual Hosting Year 5	$11,762.00	$11,762.00
			Subtotal	$58,810.00
Annual Database Services for 3 Picks/Year (Year 1-5)				
32	1	Annual Database Services for 3 Picks/Year - Year 1 _Includes:_ - Audio recording and processing (up to 100 phrases using the current voice talent) - Database administration - Project Management Support - Systems Engineering Support - Database QA testing - Database deployment	$46,148.00	$46,148.00

33	1	Annual Database Services for 3 Picks/Year - Year 2 *Includes:* - Audio recording and processing (up to 100 phrases using the current voice talent) - Database administration - Project Management Support - Systems Engineering Support - Database QA testing - Database deployment	$47,532.00	$47,532.00
34	1	Annual Database Services for 3 Picks/Year - Year 3 *Includes:* - Audio recording and processing (up to 100 phrases using the current voice talent) - Database administration - Project Management Support - Systems Engineering Support - Database QA testing - Database deployment	$48,958.00	$48,958.00
35	1	Annual Database Services for 3 Picks/Year - Year 4 *Includes:* - Audio recording and processing (up to 100 phrases using the current voice talent) - Database administration - Project Management Support - Systems Engineering Support - Database QA testing - Database deployment	$50,427.00	$50,427.00
36	1	Annual Database Services for 3 Picks/Year - Year 5 *Includes:* - Audio recording and processing (up to 100 phrases using the current voice talent) - Database administration - Project Management Support - Systems Engineering Support - Database QA testing - Database deployment	$51,940.00	$51,940.00
		Subtotal		$245,005.00
Extended Hardware Warranty & Software Maintenance for Existing Equipment				
37	1	Hardware Warranty for Existing Equipment - August 1, 2020 - July 31, 2021	$54,563.00	$54,563.00
38	1	Hardware Warranty for Existing Equipment - August 1, 2021 - July 31, 2022	$56,200.00	$56,200.00
39	1	Hardware Warranty for Existing Equipment - August 1, 2022 - July 31, 2023	$57,886.00	$57,886.00

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40	1	Hardware Warranty for Existing Equipment - August 1, 2023 - July 31, 2024	$59,622.00	$59,622.00
41	1	Hardware Warranty for Existing Equipment - August 1, 2024 - July 31, 2025	$61,411.00	$61,411.00
			Subtotal	$289,682.00
			Total	$2,954,417.00

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Quote Breakdown

Product Description	Capital Price	Operating Price Year 1	Operating Price Year 2	Operating Price Year 3	Operating Price Year 4	Operating Price Year 5	Comments
CAD/AVL ITS System	$751,424.00	$6,179.00	$42,095.00	$43,173.00	$44,282.00	$45,426.00	Includes Transit Control Head, EA Switch, Equipments, Software and Services
BusTime	$146,064.00	$0.00	$16,808.00	$17,312.00	$17,831.00	$18,366.00	Includes BusTime Software and Services
Public Wi-Fi Router Equipment	$467,296.00	$0.00	$1,733.00	$1,785.00	$13,486.00	$13,890.00	Includes WR64R Router, Equipments, Software and Services
Automated Vehicle Monitoring (AVM)	$336,192.00	$0.00	$8,726.00	$8,988.00	$9,258.00	$9,536.00	Includes AVM Software and Services
UTA APC Integration & Ridecheck Plus	$198,696.00	$0.00	$16,219.00	$16,705.00	$17,207.00	$17,723.00	Includes integration with UTA APC and Ridecheck Plus Reporting Software
Hosting	$74,520.00	$11,762.00	$11,762.00	$11,762.00	$11,762.00	$11,762.00	Includes hosting set up fees and annual recurring fees
Annual DB Services - 3 Picks/Year	N/A	$46,148.00	$47,532.00	$48,958.00	$50,427.00	$51,940.00	Includes 5 years of Database Services
Extended Maint. on Existing Equipments	N/A	$54,563.00	$56,200.00	$57,886.00	$59,622.00	$61,411.00	Includes Hardware Warranty & Software Maintenance on existing equipments
Subtotal	**$1,974,192.00**	**$118,652.00**	**$201,075.00**	**$206,569.00**	**$223,875.00**	**$230,054.00**	
					Total	**$2,954,417.00**	

Capital Price Breakdown	
Category	**Price**
Hardware	$536,083.00
Software	$649,097.00
Implementation Labor	$789,012.00
Capital Price Total	**$1,974,192.00**

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Notes:

- In light of the current COVID-19 pandemic, Clever Devices and our suppliers are subject to Federal mandates which may slow production. Emergency Federal and State mandates, such as "shelter in place" or self-isolation requirements, may affect our ability to provide support and service at an optimal level. If circumstances outside our control force us to revise the schedule or impact support and service levels, we will communicate this to Gainesville RTS immediately and work with you to mitigate any disruption to the project and operations.
- Cellular data and SMS services are the responsibility of Gainesville RTS.
- The farebox interface is Clever Devices standard interface via J1708. Gainesville RTS is responsible for installation of the J1708 cable prior to Clever Devices connecting the adapter and performing ATPs.
- Content filtering of the public Wi-Fi is the responsibility of Gainesville RTS.
- All required data will be provided to Clever Devices 4 weeks prior to the schedule / database activation date.

Payment Milestones:

- Please see section 4 for our proposed payment milestones.

2.2 CLEVER DEVICES' STANDARD TERMS AND CONDITIONS OF SALE

2.2.1 SOFTWARE LICENSE

Requirement for End-User License Agreement

- Any entity procuring Clever Devices Ltd ("Clever Devices") licensed products which is not the end-user of the licensed product ("Non End-User"), such as but not limited to an Original Equipment Manufacturer to which Clever Devices is a supplier, is obligated to provide Clever Devices with the End-User License Agreement (covering the software licenses associated with the contents of this quotation/proposal) signed by an authorized official of the End-User. Failure by a Non End-User to provide such a properly executed Clever Devices End-User License Agreement to Clever Devices shall make the Non End-User liable for any misappropriation or misuse of Clever Devices' products.

Obligations of Non End-User Procuring Entities

- Non End-Users are granted the right to install the licensed products and to test their functionality in the End-User designated space or equipment. Non End-Users do not have licenses to otherwise use or operate Clever Devices' products and no other licenses or rights to use are provided or implied by this Agreement

2.2.2 GENERAL

- All Purchase Orders must be sent to the following email address: customerPO@cleverdevices.com
- Prices are quoted in US$ unless otherwise specified
- Prices do not include shipping, sales tax or duties, which will be added if applicable
- Unit Prices are good only for the total number of units quoted. Lesser quantities may command a higher per unit cost because of certain fixed costs contained in the quote
- Prices quoted herein are valid for one hundred and fifty (150) days from the date of quotation or proposal, and are applicable to the quantities covered by this quotation; any change in quantity, delivery or elimination of one or more items may require a revision to the prices quoted

- Orders for one bus set (i.e. pilot bus) must be part of a complete quantity order or must be accompanied by a Letter of Intent to order the entire quoted quantity
- Clever Devices shall be paid for the items quoted above as follows:
  - Payment terms are Net 30 days, subject to prior approval of our Credit Department
  - Unless otherwise specified, Clever Devices shall be paid for all deliverable items, terms Net 30 days from the date of shipment from Clever Devices, or when services rendered by Clever Devices are completed
  - No customer account shall be credited for parts returned without prior written authorization from Clever Devices and receipt of such goods
  - Clever Devices' General Terms and Limits of Liability apply
- Unless specifically advised in the quote, lead time for Hardware and Services will be as advised by Clever Devices upon receipt of order. Standard lead time for hardware is sixteen (16) weeks from receipt of order, but Clever Devices stocks standard parts and if available will be shipped earlier. Delivery is F.O.B. City of Gainesville, Regional Transit System, 34 SE 13th Road, Gainesville, FL 32601.
- Clever Devices reserves the right, without advance notice, to make engineering or production changes, to include substitution of part numbers and/or vendor sources for components that may affect the design or specifications of its products, provided said modifications will not materially affect the performance of the product
- Unless negotiated and agreed to otherwise in writing, in no event is Clever Devices liable for consequential damage from late or non-delivery, malfunction or failure of its products

2.2.3   CLEVER DEVICES' WARRANTY POLICY

Clever Devices' warranty obligations are limited to the terms set forth below:

1) New Manufactured Products Limited Warranty
   a) Clever Devices guarantees for a period of one (1) year from original factory shipment that each product is free from defects in material and workmanship.
   b) If the product fails to operate as specified and has not been tampered with or abused during this warranty period, Clever Devices or its authorized service agents shall either repair or replace any defective part or the product free of charge.
   c) Bench fees will apply to any product received by Clever Devices with no-trouble-found. Products returned with failures caused by improper use or installation will be repaired and the appropriate charges will apply. Such services by Clever Devices shall be the original purchaser's sole and exclusive remedy. Clever Devices shall not be responsible for the cost of removal or installation of warranted products unless a prior written agreement has been reached at the time of the original purchase contract. Clever Devices' labor rate table will apply for all product replacement time.
   d) Clever Devices will repair or replace, at Clever Devices' option, any defective product under warranty. Clever Devices will not honor credit requests on any defective used product. Product repair or replacement will be the only option available to the original Purchaser.
   e) This warranty does not apply: (a) to damage caused by accident, abuse, misuse, misapplication or improper installation (b) to damage caused by conditions outside Clever Devices specifications including but not limited to vandalism, fire, water, temperature, humidity, dust or other perils (c) to damage caused by service (including upgrades) performed by anyone who is not a Clever Devices Authorized Technician (d) to a product or a part that has been modified without the written permission of Clever Devices or (e) if any of Clever Devices' serial number has been removed or defaced, or (f) expendable or consumable parts, such as batteries and flashcards.

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f) Clever Devices shall not be liable for any special, incidental or consequential damages for loss, damage directly or indirectly arising from customer's use or inability to use the equipment either separately or in combination with other equipment, or for personal injury or loss or destruction of other property, or from any other cause.

2) Warranty Repair Policy

a) A replacement or repaired product assumes the remaining warranty of the original product or 90 days, whichever provides longer coverage for the original purchaser. When a product is exchanged, any replacement product becomes the original purchaser's property and the replaced product becomes Clever Devices' property.

3) Obtaining Warranty Service

a) The original purchaser is responsible for returning any defective products to Clever Devices after obtaining a Returned Merchandise Authorization (RMA) number from Clever Devices' Customer Service Department at 888-478-3359. No products will be accepted without an RMA number. When requesting an RMA number, be sure to have the serial number of the equipment available.

b) The original purchaser must package the product properly for return shipment. Clever Devices is not responsible for any damage to the product caused during transit or for any package lost by the shipping company.

c) The original purchaser assumes all cost in shipping the defective product to Clever Devices and Clever Devices will assume the cost in shipping back to the customer. All replacement/repaired products are shipped UPS Ground unless a rush is requested. The cost of shipping using any mode other than UPS Ground is to be paid by the original purchaser.

Ship to:

Clever Devices Ltd.
Attn: Service Department RMA # _____
300 Crossways Park Drive
Woodbury, NY 11797

2.2.4 CLEVER DEVICES' RETURN AND EXCHANGE POLICY

Clever Devices does not accept returns without a Returned Material Authorization. Custom-built equipment or merchandise specifically ordered for you is not returnable.

Where return of unused merchandise is at the request or convenience of the customer, a 25% restocking fee will be charged. No unused merchandise will be accepted for return later than thirty (30) days after shipment. All returned merchandise shall be sent freight prepaid and properly insured by the customer. Clever Devices reserves the right to select the method of shipment. Should you receive merchandise damaged in shipment, it is your responsibility to file a damage claim immediately with the delivery carrier.

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2.2.5 CLEVER DEVICES' NON-WARRANTY SERVICE POLICY

1) Non-Warranty Repair Policy
   Non-warranty repairs made by Clever Devices carry a limited repair warranty of 90 days on services and replacement parts only. Defects in our repair work or any parts replaced will be corrected at no charge if the defect occurs within 90 days from shipment from our facility.

2) Field Service
   Field service calls will be made to customer's facility upon request. Time, expenses, and materials will be charged, as outlined below, unless other arrangements are made in advance. Field Service is treated as any repair. All travel must be pre-approved and is based upon actual prevailing airfare, hotel/motel rooms and Per Diem rates. Contact Clever Devices for current Per Diem rates.

GENERAL FIELD SERVICE RATES:	
Transportation	Actual cost* using commercial coach or business class air, first class rail, bus, rental car, and cab facilities as applicable, including transportation to and from the airport.
Mileage Allowance	IRS allowable rates
Personal Expenses	Per Diem rates
Basic Rates	150.00** per hour for actual time in customer's plant, plus a flat rate for round-trip travel time.
Miscellaneous	Actual charges for other necessary items such as tolls, parking and freight charges*.
*	Charges may be subject to a 12% administrative fee.
**	Rates may vary because of weekend/holiday rates, the type of service required, a previously negotiated rate and/or personnel involved.

3) Non-Clever Devices Product Received for Repair
   Product received for repair that were not manufactured or supplied by Clever Devices will be logged in and Clever Devices will require that the customer supply us with their shipper number in order to return the product. Such product will be held for a period of up to 90 days and will then be subject to discard, unless alternative arrangements have been agreed to in advance.

XXXXXXXXX

Johnna McQuinn
Strategic Account Manager
516-736-0620

jn

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3   PROPOSED SOLUTION

Clever Devices is proposing our standard off-the-shelf ITS system solution that capitalizes on RTS' investment in DR 700 onboard technology. The proposed solution provides natural growth of RTS' ITS technology at the most affordable price. In general, this requires only fixed-end software with hosting and cellular services. The onboard solution includes migration to Clever Devices' IVN software platform, upgrading 25 buses to be equivalent to the recent retrofit campaign, and installation of an onboard router for the entire fleet to support public Wi-Fi (as well as future growth such as providing access to cellular and WLAN services for DVRs).

Clever Devices' ITS system solution/architecture and deliverables are described in the following sections.

3.1   SYSTEM ARCHITECTURE

Clever Devices considers the information in this section to be confidential/proprietary. Therefore, as requested by RTS, we have removed it from this document and submitted it in a separate document solely for confidential information. Please see the accompanying document.

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3.1 DELIVERABLES

The following are the deliverables for the project. It is important to note that Clever Devices' deliverables include all components shown as ▢ and any optional items shown as ▢. Also, **all Clever Devices' user interfaces are royalty free** and can be installed or accessed on any workstations at RTS.

FIXED-END SYSTEMS	
CleverCAD CAD/AVL	A state-of-the-art CAD/AVL system that provides a reliable, mature, and feature rich solution for fleet management. With CleverCAD you know in real-time the status of your fleet as well as the ability to affect change to accommodate normal and abnormal service interruptions. Features include maps, incident management, event management, headway management text messaging, user configuration of grids and much more.
CleverCAD Disruption Management	CleverCAD's Disruption Management is an enhancement that provides the user with a simple and intuitive interface to make schedule adjustments in real-time including detours. This affords dispatchers the ability to accommodate and restore service that has been disrupted due to unplanned circumstances.
BusTime RTPI	BusTime, is a field-proven solution that allows RTS to communicate the operational status of the fleet (predictions) as well as relay public service messages, alerts, and service bulletins such as system delays and emergencies to the public. A trustworthy, accurate, and fully automated real-time passenger information system that disseminates information to the public via a responsive website (map and tabular), email, GTFS-RT, <u>free</u> BusTime developer API, wayside LED and LCD signs (not included), and 511 regional systems (not included). The BusTime responsive website is intuitive and easy to use on computers, laptops, tablets and smartphones.
GTFS-RT	Google's General Transit Feed Specification – Realtime (GTFS-RT) is an interface specification that provides real-time access to the fleet status including location, bus arrival information and much more. GTFS-RT interface is available to third parties to develop custom applications. GTFS-RT is a standard interface from our BusTime product.
CleverWorks Data Management	CleverWorks makes data management easy and affords RTS personnel to be "in complete control" of their system. CleverWorks is a state-of-the-art data management tool that simplifies and provides a single source solution for all ITS data on the bus including route and stop inventory management with correlation to schedule data, AVA management, equipment configuration management, as well as RTPI data management.
HASTUS Integration	CleverWorks seamlessly automates the use of schedule data provided by RTS from the HASTUS Scheduling Solution and ensures that schedule data changes are exercised once and easily distributed to all system components.
GTFS	Google's General Transit Feed Specification (GTFS) defines a common format for the static schedules and associated geographic information. GTFS data is available in Google Maps and to third parties to develop custom applications. GTFS is a standard output of CleverWorks and is included at no charge.

CleverReports Web Reports	CleverReports is a web-based business intelligence reporting solution that compiles information from system components into a transit database, analyzes the data, provides many built-in meaningful reports, and allows RTS to build custom reports using any data within the CleverReports database.
DCC	The Data Communications Controller is the real-time communications gateway to manage data communications between the fixed-route fleet and fixed-end BusTime and CleverCAD ITS technologies.
BusLink	A reliable bulk data distribution management tool that provides automatic distribution of all updates and data to the system components, and automatic retrieval of all performance and detailed log data from the fleet using cellular. Clever Devices will utilize the existing WLAN access points at RTS depot for all bulk data transfers.
Clever Server Manager	Clever Devices utilizes our Clever Server Manager for system monitoring to identify usage, system anomalies, or abnormalities. Clever Server Manager provides centralized monitoring as well as real-time and historical reporting of the servers, network resources, and applications.
HR Integration	CleverCAD has multiple interfaces to support automatic retrieval or manual data entry of RTS HR data.
Hosted Solution	Clever Devices has included the cost of hosting the system at our Tier-2, high-availability hosting facility. The advantage to RTS is savings in manpower to maintain the IT infrastructure as well as Clever Devices' real-time monitoring of the system to quickly resolve any rare anomalies that may occur.
Dispatch Workstations (2x)	Clever Devices has included two (2) dispatch workstations, each with dual displays.
Bus in a Box (BiB)	Clever Devices has included one Bus in a Box for RTS to use for training and/or maintenance. The BiB is a model onboard system that includes the equipment proposed with our system mounted on a board that is portable.
Ridecheck Plus (R+) Ridership Report	A comprehensive APC ridership reporting solution from Clever Devices that includes user configurable data validation/cleansing parameters, statistical processing, as well as user configurable filters to apply to tabular and graphical ridership reports. R+ also support generation of NTD data such as Annual Passenger Miles (PMT) and Unlinked Trips (UPT) to support RTS in securing formula funds from the FTA.
AVM	The most sophisticated and mature vehicle health monitoring solution available in the transit industry bringing efficiency and a significant return on investment A web-based reporting solution that compiles fleet information collected by IVN into business intelligence for maintenance organizations

FIXED-ROUTE BUS HARDWARE AND SOFTWARE

DR700 Upgrade to IVN (136)	The entire fleet has DR700 which are hardware identical to IVN. The proposed solution includes upgrading the onboard software and harness to support IVN functionality. IVN is an integrated, proven, and rugged platform (hardware and software) that provides all the onboard ITS functionality as well as integrates and controls the TCH (operator interface), and existing bus systems. IVN functionality includes single point logon, AVA, APC, turn-by-turn instructions (maps and TTS), CAD/AVL features, and support future growth. IVN includes embedded GPS and interfaces to the router to access cellular and WLAN data services.
TCH (25x)	Proven and rugged operator interface that provides a daylight readable 9" color display and has a touchscreen and a pedestal mount. The TCH is required to support IVN functionality and Clever Devices will provide it for the 25 buses that have the DR OCU. The remainder of the fleet already has a TCH.
EA Switch (136x)	As a safety feature, the operator can covertly notify dispatch that there is an emergency situation by pressing the emergency alarm (EA) switch, initiating covert monitoring.
AVC Microphone Interior (25x)	To accommodate a pleasing rider experience onboard the bus, we have included our AVC microphone that is mounted on the interior of the bus to monitor the ambient noise level so that audio playback of stop announcements and public service messages are automatically adjusted to just the right audio volume. This AVC microphone is required to support IVN functionality and Clever Devices will provide it for the 25 buses that have the DR AVC microphone. The remainder of the fleet already has this AVC microphone.
AVA (136x)	Automatic Voice Announcement (AVA) is configurable through CleverWorks and onboard is fully automated. Upon operator logon, IVN automatically triggers AVA audio on the exterior speakers and interior speakers, controls the destination sign and drives the interior LED signs to provide: • Next Stop Announcements (interior) • Transfer Announcements (interior) • Route and Destination Announcements (exterior) • Public Service Announcements (interior) • Stop Requested • Automatic Volume Control • Priority Configuration of Announcements
Turn-by-Turn Instructions (136x)	Maps and Text to Speech (TTS) onboard provides turn-by-turn instructions to the operator that results in improved service and safety. TTS includes one language.
6-Band Antenna (25x)	An antenna to support the ITS system. Mounted on the roof of the bus, it supports 2 elements for cellular, 3 elements for WLAN, and one element for GPS. This antenna is required to support the desired functionality and Clever Devices will provide it on 25 buses to replace the existing 4-band antennas.

Public Wi-Fi Antenna (136x)	An antenna to support public Wi-Fi. Mounted on the interior of the bus, it ensures quality coverage to the riding public. This antenna is required to support the desired functionality and will be provided for the entire fleet.
Cellular only Antenna (136x)	An antenna to support public Wi-Fi. Mounted on the roof of the bus, it provides cellular connectivity dedicated to public Wi-Fi to ensure a reliable and secure solution. This antenna is required on the entire fleet.
Destination Sign Interface (136x)	IVN seamlessly interfaces with the existing destination signs using J1708. Clever Devices' IVN includes automatic control of the destination signs to ensure the sign always displays the current information and eliminates operator interaction so they can focus on driving.
PA System Interface (136x)	Included with the IVN upgrade. IVN includes independent audio amplifiers with hi-fidelity and interfaces to the existing public-address microphone as well as the existing interior and exterior speakers to support automated and manual announcements.
Harness Upgrade (136x)	Clever Devices will utilize the existing harness in the bus and upgrade as necessary to support additional features and IO required by IVN.
GFI Farebox Interface (136x)	Clever Devices has included the IVN software and harness interface to the GFI farebox as well as the license and upgrade of the existing GFI farebox to support Single Point Logon. Installation of the IVN to GFI farebox cable requires getting under the bus. RTS will be responsible to install this cable, as there are safety issues with getting under the bus and operating the lift.
UTA Interface (136x)	Clever Devices has included the IVN software and wiring interface to the existing UTA APC sensors to collect ridership data.

OTHER ITEMS	
Spares	Clever Devices has included pricing to ensure RTS has a total of 5% spares for all onboard equipment. This takes into account spares that already exist at RTS. 5 IVN 5 TCH 5 6-band Antenna 7 AVC Microphone 7 EA Switch 7 WR-64 7 Cellular only Antenna 7 Public Wi-Fi Antenna
Warranty	Clever Devices has included and itemized warranty for 5 years.

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	Data Services for database administration, QA testing, and deployment services per pick for 3 picks and includes:
Data Services	• Database administration (Schedule data processing, routes, stops, AVA data, and more) • Project Management support • Systems Engineering support • Database quality assurance testing • Database deployment

3.2   ONBOARD SYSTEM

3.2.1   IVN UPGRADE

The existing DR700, shown to the right exists on the fleet. It will be upgraded with software to the IVN platform.

Clever Devices' onboard system is IVN (Intelligent Vehicle Network). IVN is an industrialized computer designed specifically for the transit marketplace. It combines a plethora of processing power for future growth, a comprehensive set of industrial communication interfaces to all onboard systems, state-of-the-art network interfaces for on and off-board communications, multimedia capability for audio and video, the most accurate navigation system available (PerfectNav), and most importantly an extensive and proven library of expert algorithms to meet all your ITS needs. IVN utilizes open standards and is the primary data processing and central communications hub on the vehicle.

All of the processing necessary to meet RTS' requirements are provided in IVN without the need for other equipment. It is a fully contained, operational, and reliable solution.

IVN has embedded hardware and expert algorithms that include the following ITS features.

IVN ITS FEATURES	
Power Management	Power filtering to ensure continued operation and automatically power down after a user configured time.
CAD	Full support of all onboard CAD (Computer Aided Dispatch) functionality. • Logon • Text messaging to dispatch • Text messaging from dispatch • Dispatch initiated text messages • AVL location updates • Timepoint encounter • Route & schedule adherence • Emergency alarm • Start of trip • Power status • Time Sync • APC counts
Pre- and Post-Trip Inspection	Automate pre-trip and post-trip inspection with configurable, easy to select inspection points and with full bus graphics for physical inspection points.
Single Point Logon	Provide a single point logon for all onboard systems with both local logon validation and centralized validation by CleverCAD to support: • Head/destination sign • GFI fare system • APC • AVA

	IVN includes maps with turn-by-turn instructions using text to speech (TTS).
Maps	
Route & Paddle Information	IVN has all the schedule data and provides the operators with access to this information in an easy to read format.
AVA	Provide all automatic voice announcements (AVA) functionality for audible and visual announcements for the interior and exterior of the vehicle including automatic volume control (AVC).
Performance Data	Collect, store and correlate all onboard performance data. Includes over 62 events and 70 different data fields.
Geofencing	Ability to assign functionality to geographical areas within the service area.
AVL / PerfectNav	Navigation system that incorporates GPS, gyro, odometer, Kalman filters, map matching, and our proprietary navigation algorithms to ensure the fleet location is accurate and reliable to support: • All ITS features • Route and schedule adherence • Onboard maps with turn-by-turn instructions • Monitor location and trigger events associated to user-configured geofences
BusLink Support	All software updates and data transfers are handled quickly, efficiently, and reliably through WLAN or any wireless IP based technology such as cellular.
Real-Time Data	Support of real-time data communications to the fixed end for CAD and real-time passenger information.
APC Interface	Correlate all onboard data for performance and APC historical reporting. Clever Devices has proposed integration with RTS' existing UTA APC sensors.
GFI Fare System Interface	Share information and provide a singular, full user interface. Clever Devices has proposed integration with RTS' existing GFI Fareboxes.
AVM	Process the user-specified data points and algorithms to collect all performance and fault data for AVM reporting.

3.2.2 TCH (TRANSIT CONTROL HEAD)

Clever Devices' operator interface is the Transit Control Head (TCH). This equipment provides operators with a visual display of operational status and incoming messages as well as providing maintenance personnel with access to diagnostic information to help maintain the system and diagnose problems. The TCH is tightly integrated with IVN to provide the bus operator with single point logon and easy access to onboard ITS functionality.

The TCH is a DVI screen. It incorporates highly reliable touchscreen technology and utilizes a large 9" screen. All text is in a large font and is easy to read. The display is backlit and has brightness control and an anti-glare coating, making it easily readable under any ambient light conditions. The screen navigation is intuitive for all transit personnel and is easy to learn by operators.

The TCH is a graphical color display, and Clever Devices has selected the color palette to be acceptable to users with all types of color blindness. Over 20 touchscreen soft keys with visual and audible feedback are available, whose functions are software-programmable based on the displayed screen. These keys provide direct access to functions and menu listings for all operator and maintenance activities.

To prevent accidental shutdowns, there are no power switches on the TCH. The operator is not able to shut off the TCH or manually shutdown the application software. IVN and the TCH power down automatically a configurable amount of time after the run switch (power switch) of the bus is turned off. Clever Devices will work with RTS to identify desired locations for proper installation of the TCH for each bus type, finding somewhere comfortable within safe reach of the bus operator.

The TCH has a rugged aluminum housing that meets all NEMA-4 specifications for hose-down, icing, and salt spray, including the sealed covert microphone. The TCH dimensions are 10.63" x 2.52" x 7.99".

3.2.3 IVN ITS FUNCTIONALITY

Clever Devices' operator interface to IVN functionality is through the TCH. IVN includes the provision of audible and visual annunciation for every stop, route, and route variation in the RTS fixed route system. Furthermore, as a safety feature, the operator can covertly notify dispatch that there is an emergency by pressing the emergency alarm (EA) switch. The screens and user interface have been custom designed for transit, considering ergonomic factors and input from many of our clients. With icon and graphic-based touchscreen technology, the result is a full color representation of the soft keys and functions. All icons are customizable and can be replaced with text, different images, or a combination of both. The interface is simple and intuitive, which makes it quick to learn and use. Controlled by IVN, the TCH functionality is full featured and supports all ITS applications provided by Clever Devices.

3.2.4 WR64 ROUTER – DUAL CELLULAR – DUAL WLAN

Clever Devices proposes the Digi WR64 onboard router. A reliable broadband wireless link to every transit bus is almost commonplace. The new challenge is the ever-increasing demand for bandwidth as onboard applications are deployed to improve efficiency, convenience, safety and security and to attract and retain passengers.

The WR64 is ideal for challenging transportation and mobile environments, Digi WR64 is a dual cellular LTE-Advanced router with true enterprise class routing, security, firewall and integrated VPN. It offers a flexible interface design with an integrated Wi-Fi access point, USB, serial and 4-port Ethernet switch.

FIGURE 1: RUGGED WR64

Public Wi-Fi access for riders is managed securely and without impact to onboard bus systems. Triple carrier aggregation on each cellular interface can be combined to deliver up to 1.2 Gbps to passengers. Onboard systems retain priority and any remaining bandwidth is made available to Internet traffic. A captive portal and splash page enable term acceptance, targeted messaging and agency branding. Standard HTTP/DNS redirect can be used to block malware and unwanted content through popular 3rd party service providers or an agency server.

Reliable powering circuitry supporting 9-36VDC input with ignition sense for direct integration into vehicles power source. Dual cellular and Wi-Fi modules provide true segmented traffic flow of private and public data for fare collection, CAD/AVL data, DVR (video files) backhaul and passenger Wi-Fi access.

It functions as a central gateway for all vehicle communications, is secure, easily managed, high performance, versatile and extremely reliable. The WR64 includes the following features:

- Segmented private vs. public data communication across dual 600 Mbps CAT 11 cellular modules
- Vehicle data offload over 1.7 Gbps 802.11ac Wi-Fi backhaul
- Passenger Wi-Fi over 867 Mbps 802.11ac access point
- Wired Gigabit Ethernet (4-port) for onboard systems
- Future-built with powerful quad-core 1.91GHz, 64-bit CPU
- Manage and control devices with Digi Remote Manager®, a web-based management tool for all Digi cellular routers and gateways
- Cryptographic co-processor with secure key generation and storage

The Digi WR64 provides the cellular and Wi-Fi services to any onboard device that has Ethernet.

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3.2.4.1 DIGI REMOTE MANAGER

Managing mobile network devices is paramount to maintain the system. Clever Devices has included Digi Remote Manager with our proposal. It provides an efficient, cost-effective way to remotely monitor, update and manage Digi intelligent routers and includes:

Device Health Monitor: Lets you set the performance parameters for healthy devices and create reports and alarms to stay ahead of network problems

Firmware Updates: Allows you to schedule firmware updates to groups of devices

Your customers depend on you for reliable connections. With Digi Remote Manager, you can visually monitor and report on the performance metrics that matter most, including:

- Cellular connection history
- 3G/4G LTE signal quality
- Packet delivery
- Latency
- Cellular data sent and received
- CPU and memory utilization
- Network interface throughput

Set performance thresholds and inspect individual devices

View the summary status of groups of devices

Device Health Manager provides a visual dashboard displaying the status of your devices in the field based on health thresholds that you define

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3.3 CLEVERCAD

CleverCAD is a state-of-the-art Computer Aided Dispatch and Automatic Vehicle Location (CAD/AVL) solution designed specifically to meet the service management needs of modern mass transit agencies such as RTS. CleverCAD and Clever Devices' onboard IVN system combine to provide dispatchers and supervisors with critical real-time fleet information, comprehensive communications, and complete situational awareness for efficient management of resources.
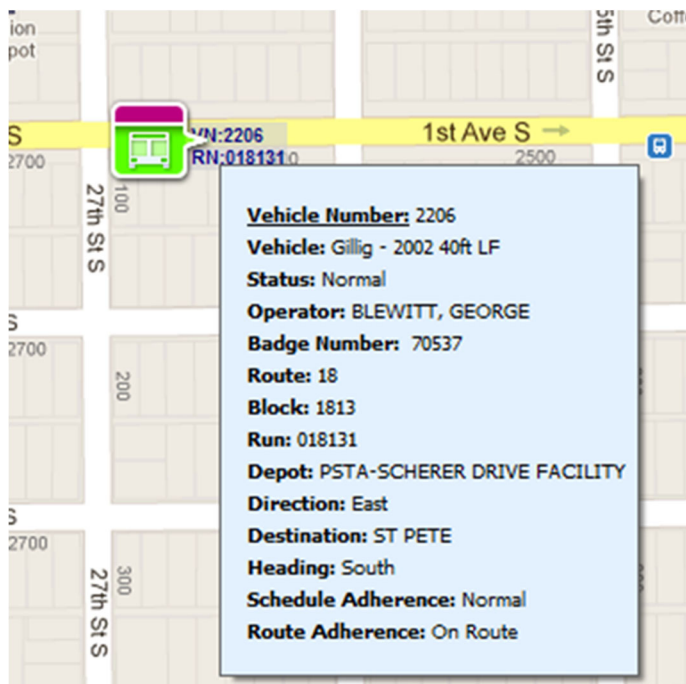

FIGURE 2: CLEVERCAD VEHICLE INFORMATION

CleverCAD is "your eyes and ears on the street" conveying a clear, real-time view of the location and status of all vehicles equipped with IVN. CleverCAD also provides integrated emergency alarm functionality, covert audio monitoring, and dedicated vehicle tracking windows which enable RTS to make informed decisions and quickly respond to safety or security concerns.

Feature-rich text messaging between fixed and mobile users greatly reduces voice traffic for common communications, and when calls are required, dispatcher-controlled voice call queues ensure that appropriate priority is enforced. CleverCAD can integrate with an existing radio system or we can optionally provide our state-of-the-art mobile data Voice over IP (VoIP) solution.

CleverCAD streamlines day-to-day operations so that RTS can accomplish much more with its existing resources. The CleverCAD map, the many configurable grid views, and the on-time performance dashboard all provide clear and concise information to support dispatchers in identifying, responding to, and even preempting service disruptions. Built-in incident reporting and management tools with auto-population of system data ensure complete and accurate documentation of captured events. The deployment of CleverCAD will result in improved transit service, improved customer information, and reduced costs to RTS.

CleverCAD builds on modern technology with a multi-tier architecture, strategic integration of web-based technologies and feature-rich Google Maps. Its contemporary design enhances dispatcher performance,

efficiently presents crucial fleet and operational information, and supports rapid deployment. CleverCAD's information-driven user interface provides powerful command and control capabilities for dispatch and enhances fleet visibility and transit service management. CleverCAD is straightforward and easy to learn, navigate, and personalize.

The advantage to RTS is that CleverCAD:

- Provides powerful tools in a modern and intuitive user interface
- Dramatically increases fleet status visibility
- Improves communications between the fleet, dispatchers, and field/street supervisors
- Organizes fleet and operational data into meaningful information
- Alerts users about unplanned events and provides efficient means of handling.
- Creates automated and user-prompted documentation of incidents
- Records all data and communications for reporting, tracking, and documentation of issues

CleverCAD affords RTS the opportunity to make an additional and significant leap forward in transit service management. It enhances and automates the processes of real-time monitoring, identification of alert conditions, handling of events, and documentation of incidents. With CleverCAD, the entire fleet can be monitored and managed from RTS' control center. The deployment of CleverCAD, along with Clever Devices' training and hands-on support, will ensure success and a more efficient transit service operation.

3.3.1 CLEVERCAD FEATURE OVERVIEW

CleverCAD is a state-of-the-art component of Clever Devices' ITS system solution. Table 1 provides a summary of its major features and capabilities.

TABLE 1: SUMMARY OF CLEVERCAD FEATURES

CLEVERCAD MAJOR FEATURES	
User Authentication and Work Assignment	- Active Directory integration authenticates system access based upon existing employee database - Management of user preferences and rights by the user allows for the use of any available workstation - Configurable for each user to have access to specific functions or all functions, read only or read/write, as well as their work assignments - CleverCAD guarantees that all work is assigned to a dispatcher - Configurable work assignments by list of vehicles, routes, depots, different operations within a single schedule, (contracted vs internal, or group of depots) - Dispatcher only sees their assigned work
Map Window and Menus	- Centralized quick and intuitive access to information via menus and ribbons - Modern and up-to-date map views including familiar Google controls and layout - Visual indication of real-time location and status information for all vehicles - Immediate availability of critical information, including quick and easy access to communication and action tools - Color coded "at a glance" statuses to prevent and quickly react to anomalies

Clever Devices

CleverCAD Major Features
Vehicle Logon and Validation   • Multiple levels of logon automation are supported. The system notifies the dispatcher of any invalid logon or logoffs that occur   • Integration with scheduled operator and vehicle assignments   • Remote logon or logoff to any vehicle provides opportunity for dispatcher assistance and/or override   • Logon validation is configurable
Grid Views   • Real-time detailed information is displayed in conveniently categorized windows   • Immediate notification of critical events and information requiring dispatcher intervention   • Dispatchers are informed of all anomalies associated with missing work, pending work/logon, invalid work, or work in a bad state (late, early, etc.)   • Extensive customization and configuration capabilities enable tailored display of data for optimized presentation
Vehicle Details Window   • Provides a wealth of consolidated information for any vehicle selected   • Information available at a glance includes real-time status such as location and schedule adherence as well as descriptive data such as vehicle details   • Vehicle Detail window can be initiated from the map or grid views, providing immediate context-based access
Headway Management   • Intuitive visualization of vehicle spacing for the user selected routes   • Provides information on quantity of buses and headway compliance   • Areas of vehicle bunching or gapping that require intervention are quickly identified to maintain and control reliable service   • Headway information is automatically sent in real time to the fleet for display to the bus operator
Route and Schedule Adherence Management   • Vehicles operating outside of configured adherence tolerances are quickly identified   • Console view allows the dispatchers to focus on the largest deviations which results in improved transit service and the most accurate customer information   • Calls, messages, incident reports, and other actions based upon real-time adherence information results in mitigation of problems before they grow
Event Management   • Allows the dispatcher to quickly manage and resolve vehicle events in an effective and controlled manner   • Flexible display, alert, and priority configuration abilities ensure that dispatchers focus on what is most important for an efficient resolution   • Event History window permits convenient lookup of past events   • Comprehensive emergency alarm management ensures a safe and secure transit environment

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CLEVERCAD MAJOR FEATURES	
Incident Management	• This Integrated component of CleverCAD is readily available to any authorized user (including field supervisors, management, customer service, etc.) as a web application running on an internet browser • Allows the dispatcher and other authorized users to monitor, modify, manage, and close incidents in a controlled manner • Supports user creation of incident forms that are unique to the incident type in order to accommodate your existing processes and reports (a feature very uncommon in the industry) • Automatically populates known system data for each incident report • Configurable to auto-generate the incident report for critical events
Incident Workflow Process Builder	• Allows RTS to define the incident state and the sequence for each incident type, such as en route, onsite, complete, and available • Helps to ensure that dispatchers handle each incident according to RTS' business rules • Represents online documentation for handling incidents • Can assign states to a specific CleverCAD user whether local or mobile • Track incidents from open to close, including current state, who is assigned, location of assignee (if mobile and logged on), the duration for each state
Text Messaging and Public Announcements	• Highly effective, reliable, and timely means of communication to and from dispatch, operators, and passengers • Reduces voice communication dependency and allows dispatchers to quickly handle multiple issues • Flexible destination criteria and delivery scheduling automates the process of getting important information to the right recipients at the right time • Public announcements sent from dispatch provide the ability to quickly announce and display important messages to passengers
Dispatcher Chat	• Instant communication between one or many workstation users • Allows entire conversation to be easily reviewed • Encourages information exchange
Playback	• Allows for review of specific issues related to the vehicle or operator behavior • Displays historical vehicle location, travel paths, statuses, communications, events, and more for analysis • Exportable to common video format for distribution • Investigation of incidents including verification of customer claims, management of driver compliance, and more • Select by vehicle, block, run, operator, route, date, time, or geographic area

Clever Devices

CLEVERCAD MAJOR FEATURES	
Disruption Management	• Provides the ability to make schedule and route modifications in real-time • Affords RTS the ability to quickly and efficiently deal with unplanned operational scenarios • Changes are automatically distributed and synchronized to ITS real-time components such as BusTime RTPI, SmartYard yard management, the fleet, and CleverReports historical reporting • Actions include cancelling blocks or trips, re-assigning/filling trips, reinstating a canceled block or trip, short turn, express, creating an extra block or trip, extending a block, shifting a trip, creating detours, creating bus bridge, and changing the service day

3.4 DISRUPTION MANAGEMENT

CleverCAD's Disruption Management provides the user with a simple and intuitive interface to make schedule and route adjustments in real-time. This affords dispatchers the ability to accommodate and restore service that has been disrupted, due to unplanned circumstances.

FIGURE 3: EXAMPLES OF TWITTER COMPLAINTS

The benefit of Disruption Management is that it affords the ability to accommodate changes with traceability and synchronization throughout the ITS system. Our passenger prediction software, BusTime, will reduce passenger frustrations by keeping them informed. With Disruption Management, dispatchers can create a bus bridge to accommodate a major disruption, such as a train breakdown, a football game, or an emergency. The dispatcher can also address gaps by injecting another bus, if available, as well as addressing bus bunching through turn backs by expressing a vehicle.

Any changes made within Disruption Management are reflected onboard the affected vehicles as well as in the fixed-end systems to ensure that RTS is fully informed, and to minimize, if not eliminate, impacts to RTS' ridership.

3.4.1.1   FEATURES

The below provides a summary list of features and their definitions that are available in Disruption Management:

TERM	DEFINITION
Cancel	• This operation marks sections of trips, full trips, or blocks to indicate that they are not to be performed, and to stop passenger predictions for the cancelled selection.
Reassign/Fill	• A reassign is the transfer of a trip into a block. "I am reassigning this trip from that block, into this this block". • Fill Assigns a cancelled piece of work from one block consisting of multiple timepoints or trips in order to open space on another block.
Turn Back /Short Turn	• This operation cancels time points at the end of one trip and the beginning of the next trip of the same block. • This is generally performed when the vehicle is late and needs to make up time.
Express	• This operation expresses the vehicle which allows the operator to "skip" stops on the trip and perform drop-off only activities.
Extra Block	• This operation creates an Extra block which is not part of the scheduled work received from the schedule system. • It consists of a pull-out and a pull-in. Work can be assigned to this Extra block through Fill and Reassign features.
Block Extension	• This operation is the action of extending pull-out, pull-in or both. It allows the user to push the pull-out to an earlier time, or the pull-in to a later time.
Shift Trip	• This operation shifts a trip earlier or later than it is scheduled to run.
Detour	• This operation allows the user to create an alternate path to the scheduled pattern for the vehicle to operate.
Bus Bridge/Shuttle Service	• This operation creates a brand-new trip or route bus bridge for planned and unplanned events.
Service Day Change	• This operation allows for the modification of the scheduled service day to a different day such as changing to a modified weekend service for a snowstorm.

Upon implementation of Disruption Management, the information is communicated to the appropriate Clever Devices systems including the fleet, real-time passenger information system, and reporting solution.

Standard with CleverCAD is an intuitive Schedule Display screen that details the specifics of the static schedule from the user-selected block or run. The Schedule Display is useful in finding timepoints, trips, blocks, or runs to modify with Disruption Management as well as to view the modifications that have been done.

To keep other dispatchers and other CleverCAD users informed of Service Disruptions, the Bulletin Board displays incidents that are automatically generated by CleverCAD for each Disruption Management change made including Cancel, Fill, and any lost or found notifications that a user makes for a specific block to seamlessly notify active users. The Bulletin Board is configurable by an administrator who can tailor the columns and filters shown to dispatchers, supervisors, customer service or other CleverCAD users.

3.4.1.2   DETOURS AND TURN-BY-TURN DIRECTIONS

Disruption Management provides a feature that allows the user to create detours when the need arises. The Detour feature allows the user to create a new route using map editing tools and all of the ancillary data for that route including stops, timepoints and time, AVA audio and text, destination sign codes, and running time. CleverCAD communicates the detour to Clever Devices' products including the fleet.

If the operator follows the detour, IVN remains on-route.

Creating a Detour

To create a detour, users will select a specific route(s), direction and variation. Once determined, the system renders the display of the selection on the interactive map as shown in Figure 4.

The user can then draw the detour by clicking from the start point and continuing a sequence of clicks along the path that the detour is to follow until reaching the end point. Accuracy of clicking is not critical to drawing the path. CleverCAD includes expert algorithms that allow the user to snap the new drawn detour to streets on the map. Please see Figure 4.

FIGURE 4: THE DETOUR

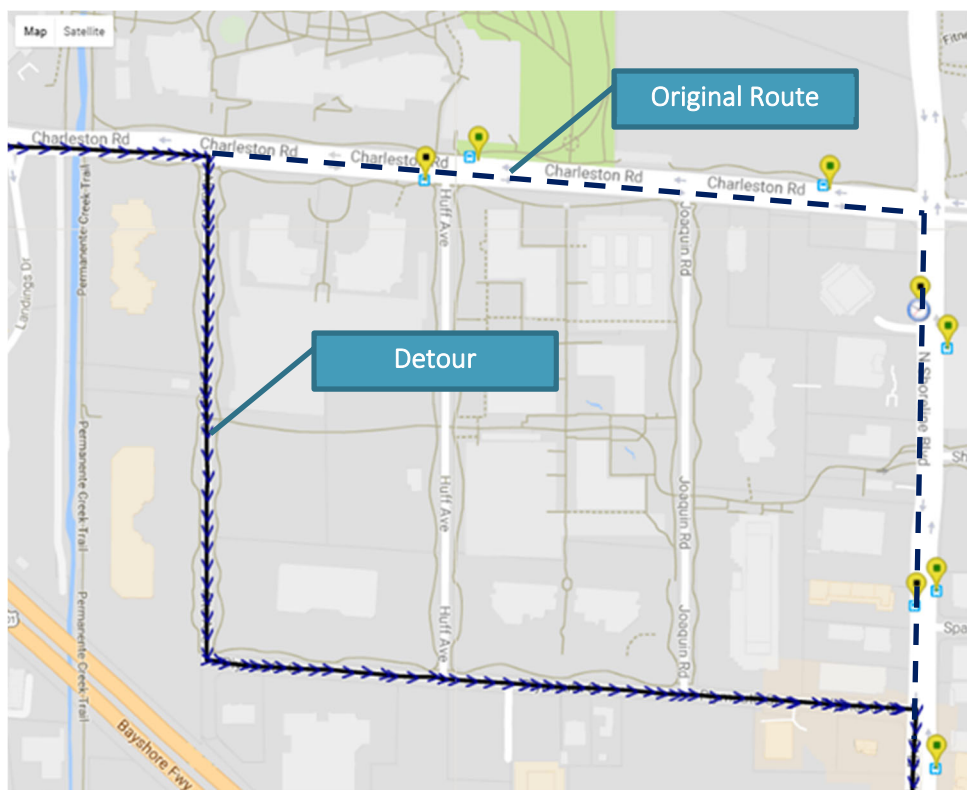In addition to modifying the route, the user has the option of adding stops to the Detour. Stops and timepoints bypassed by the Detour are automatically removed from the detour. The "Add Stop" feature allows for the creation of new stops or for adding existing stops to the detour. Once the appropriate stops are added, the user can always modify the path of the detour to make sure the stop is serviced.

Once the detour is complete, the user can distribute it in real-time to Clever Devices' products and live to the fleet by clicking the share button.

Once a detour is created and distributed in real-time, IVN automatically applies the detour. During logon or while in active service, each route impacted by the detour is notified of the detour information which includes messaging (dispatcher-generated turn-by-turn instructions or other details about the detour), paddle updates, and new routing on the map.

IVN displays the detour on the TCH map screen and will navigate and display the turn-by-turn directions associated with the detour. All next turn audible instructions and displayed routing reflect the received detour in real-time.

3.5 CLEVERREPORTS WEB BUSINESS INTELLIGENCE

Clever Devices' base solution includes our CleverReports application, which provides a comprehensive set of dashboards and reports that will revolutionize the visibility of your operations.

The reports span across several areas, such as fleet operations, schedule adherence, incident/event management, and dispatcher activity. CleverReports provides an ad-hoc report builder, email report distribution capability, and the ability to schedule reports for automatic distribution. CleverReports is backed by Microsoft SQL Server data warehouse that makes it easy to access RTS' data, allowing for the use of data extraction tools, or for the creation of custom reports with other 3rd party tools if desired by RTS.

3.5.1 CLEVERREPORTS FEATURE OVERVIEW

The reporting paradigm has changed, and reports are no longer just stagnant pieces of data printed on paper. Reports must turn data into information, which helps users make operational and business decisions. Reports must be interactive and fluid, allowing users to look at information on the fly from a variety of perspectives. CleverReports is a web-based application reporting tool with unlimited and unrestricted user access through today's most popular browsers (Internet Explorer, Chrome, Firefox, and Safari).

Clever Devices provides a variance reporting system that compares the scheduled service to the actual service and measures the difference between the two. It ingests the data from the fleet, scheduling system, and CleverCAD and then processes the data using an extensive set of business rules based on our deep knowledge of the transit space. Use of these rules allows us to create true business intelligence from the large dataset that we collect.

CleverReports is a business intelligence solution that addresses current and future reporting requirements. It generates reports such as paddle reports, relief reports, schedule reports, and several service performances reports. Users are empowered with the ability to filter the information in a single report or an entire dashboard based on what is needed at the moment.

Key Features and Benefits:
- Web based interface with no per user license fees
- Comprehensive set of dashboards designed to answer specific business questions
- Over 100 reports/sub-reports including on-time performance, running time, layover time, operator performance, dispatcher activity and many more

- An easy to use ad-hoc report builder that includes the ability to copy an existing report and make modifications creating new custom reports.
- Open data warehouse – the data belongs to you and we will provide a data dictionary should you wish to access the data directly, such as data extraction tools or with Crystal Reports.
- Ability to schedule reports for automatic delivery on daily, weekly or monthly schedule
- Intelligent report automation, so you can get reports delivered only when reports have data that meets the delivery criteria you have established
- Export to common data formats such as pdf, csv, txt, and xls

The benefits to the users of CleverReports are listed in the table below:

TABLE 2: CLEVERREPORTS BENEFITS TO USER

SOLUTION USER	KEY FUNCTIONALITY
Operator	• Empirical data will exonerate operators that operate within tolerances and safely
Controller / Dispatcher / Supervisor	• Real-time views will clearly illustrate performance against key performance indicators • Exception based reporting will highlight areas that need immediate attention
Manager	• Accurate, timely, and complete performance data will provide the decision support for service level adjustments, schedule improvements, roster and fleet level changes • Reports will clearly identify areas of performance improvement • Manages can identify operators that require retraining to bring their performance in line with corporate safety and quality standards
Customer	• The application of this information by RTS will result in more accurate schedules and increased service reliability

Reports can be printed or exported to many applications including PDF, Microsoft Word, and Microsoft Excel. Reports may also be sent manually or automatically to individuals or groups via built-in email functionality.

CleverReports also includes a user customizable ad-hoc report generating capability. This affords RTS the ability to create reports and view data your way.

TABLE 3: CLEVERREPORTS KEY FEATURES

FEATURE	DESCRIPTION
Browser Based Reports and Dashboards	• No local software to install. Uses popular browsers such as Internet Explorer, Chrome, Firefox, and Safari
Open Star Schema Data Warehouse	• Open and non-proprietary database • Optimized for ease-of-use and query/report response time

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FEATURE	DESCRIPTION
Ad-Hoc Reporting	• Users can easily create, save, share, and export their own data without database training • Users browse and drill-down to desired views and customize data through menus and drop-downs • Users can save custom reports and use them again in the future
Real-time and Historical Reports	• All SmartBus data is in one place • SmartBus data stored by IVN over the course of the day is downloaded and ingested periodically • Data from the real-time CleverCAD CAD/AVL system is available for applications, reports, dashboards, and more
Graphical with Key Performance Indicators	• Graphical presentation of data highlights the exceptions or pertinent information • At a glance, users see the result they are looking for without combing through rows and columns of text, as with tabular reports
Organized Access to Reports	• Reports can be organized by user access, department, garage, period, and product
Share Reports in Popular Formats	• Users can share create reports and share data via email, text, MS Word, MS Excel, and Acrobat PDF
Easy Report Filtering	• Users can easily customize reports and views using filters and menus

Clever Devices' CleverReports is our comprehensive business intelligence and operational analytics reporting tool. Business Intelligence dashboards and reports that result from centralized data lead to greater operational efficiencies and reductions in costs. CleverReports offers web-based dashboards, reports, and data warehousing in one easy to use yet powerful application.

Since CleverReports is a web-based application, any user in the organization with a web browser can be granted access. Major browsers such as Internet Explorer, Firefox, Chrome, and Safari are supported. In addition, mobile devices with browsers built-in can access CleverReports.

In CleverReports, and all other Clever Devices applications, the data belongs to RTS. Whether CleverReports is running on local servers or off-site hosted servers, the data and reports are readily available to RTS personnel to analyze and tune your operation.

CleverReports supports a multitude of report type including table reports, bar charts, scatter plots, area charts, line charts, pie charts, radar charts, combination charts, and Google Map reports.

The following tables represent a growing subset of dashboards and reports available in CleverReports. Over 100 reports are available in CleverReports. CleverReports provides an easy to use intuitive user interface. The reports have been combined and summarized for ease of use in the system. Reports are organized by subject matter and are numbered for easy reference. In addition, search capability is included, so the user may find a report based on all or part of a report name.

TABLE 4: STANDARD DASHBOARD LIST

DASHBOARD		
Block Summary	Layover	Running Time
Communication Loss	Off-routes	Text Messages
Dispatcher Activity	On-time Performance	Timepoint Statistical
EA Events	Operator Performance	Trip Inspection
Events	Pull-In/Pull-Out	Incident
Excessive Speed	Run Summary	

TABLE 5: STANDARD REPORTS LIST

CORE REPORTS	
Communications Reports	
Lost Communications Map and Details Report	Communications Loss Trend
Loss of Comms Summary	Loss of Comms Histogram
Fleet Reports	
Active Fleet Report	Fleet Work Summary
Vehicle Distance and Hours	
Off-Route Reports	
Off-route Summary	Off-routes by Operational Periods
On-time Performance Reports	
Running Time	On-time Performance KPI Trend
On-time Performance	On-time Performance Graph
On-time Performance by Block	Timepoint Details
Logon Summary	Schedule Adherence Statistics Report
Overall On-time	On-time Performance by Route
On-time Performance by Operational Period	Schedule Adherence Statistics Chart
Operator Performance	
Operator Performance Summary	
Trips	
Trip Running Time	Actual vs Scheduled Blocks per Day
Pull-out Performance	Block Performance Chart by Day
Pull-in Performance	Block OTP Histogram
Missed Trip Summary	Scheduled vs Actual Runs per Day
Distance and Time by Route	Run On-time Performance Histogram
Pull-out Performance by Operator	Run On-time Performance Chart
Pull-in Performance by Operator	

CAD REPORTS

Dispatcher	
Dispatcher Activity	Messages Sent from a Vehicle
Dispatcher Activity Total	Text Messages from the Vehicle by Type
Events by Hour Chart	Dispatcher Text Message Counts
Events by Day Chart	
Events	
Emergency Event Report	CAD Events Summary Table
Emergency Chart by Day	Events by Type Chart
Emergency Event Report Table	CAD Events Summary
Incidents	
Daily Lost Time	Daily Lost Time
Incident Summary by Depot	Incident Summary by Depot
Daily Lost Time	Daily Lost Time
Excessive Speed	
Excessive Speed Map Report	Excessive Speed Summary - Operator
Excessive Speed Summary	Excessive Speed Summary - Route
Layover	
Layover Map	Layover Operational Period Summary
Layover Summary	Layover Stop
Layover Operator Summary	Unscheduled Layover Stop Summary
Layover Stop Summary	

STOP REPORTS

Announcement Summary	
Dwell Time	Wheelchair Deployments
Headway Reliability	Headway Reliability by Day

TRIP INSPECTION REPORTS

Pre/Post Inspection

3.5.2 CHART AND GRAPH TYPES

CleverReports supports a multitude of chart types, including:

- Bar Charts
- Line Charts
- Pie Charts
- Bubble Charts

- Scatter Plots
- Radar Charts
- Meters and Gauges
- Column Charts

- Area Charts
- Combination Charts
- Google Map support
- Heat Maps

3.6 CLEVERWORKS DATA MANAGEMENT

CleverWorks is Clever Devices' next generation of data management tool. It is a map-based intuitive product that significantly reduces the level of effort to manage Intelligent Transit System (ITS) data.
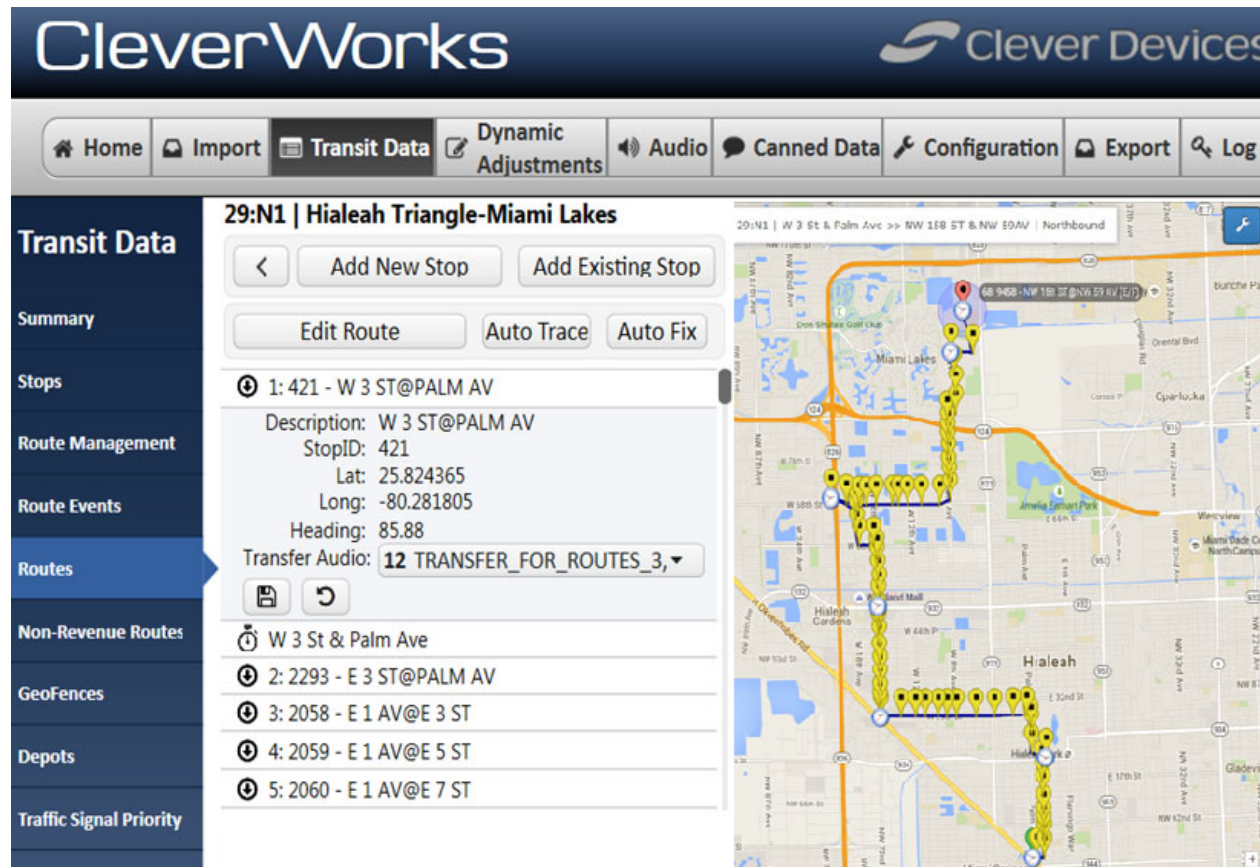

FIGURE 5: CLEVERWORKS INTUITIVE USER INTERFACE

ITS systems such as Automatic Voice Announcements (AVA), Automatic Passenger Counters (APC) Traffic Signal Priority (TSP), single point logon, Computer Aided Dispatch (CAD), Automatic Vehicle Location (AVL) and Real-Time Passenger Information (RTPI) require data that defines what these systems are supposed to do, otherwise known as build-time data. This includes the route and stop spatial/GIS data, temporal/schedule data, audio files, signage text and configuration data. Since this data can be complex, its management and data integrity are paramount to ensure completeness and accuracy. Clever Devices offers CleverWorks as a comprehensive ITS data management solution that is intuitive and comes with built in data integrity checks and measurements to ensure RTS' ITS systems run with optimum efficiency.

There are many significant advantages to RTS that are provided by CleverWorks and include:

- A comprehensive suite of powerful data editing and management tools with a modern and intuitive user-friendly interface, as shown in Figure 5.
- Built-in data integrity rules and measurements to ensure data imports into the system are valid and will not cause operational issues. 1
- Dramatically decreases the level of effort and time required to manage the ITS data saving RTS operational costs.

- CleverWorks utilizes <u>Google Maps</u> that include satellite and hybrid map views providing the user with familiar geographic information in the format they wish to view it.
- CleverWorks <u>organizes data</u> for efficient use and presents the data clearly and understandably to data administrators.

CleverWorks is backward compatible with RTS' current Clever Devices' equipment and software. This means the current dataset can be reused as a starting point to help ensure the migration from Clever Devices' data management services to RTS-maintained data is easy and seamless. Maintaining your own data will allow for more frequent and timely updates to the vehicle database. CleverWorks includes the ability to make minor changes to the announcement, schedule, APC, or geofence dataset without waiting for the next major schedule change.

CleverWorks affords RTS the opportunity to make an additional and significant leap forward in the management of build-time data required by ITS systems. It enhances your data processes and ensures your support for new ITS systems with existing resources. Clever Devices includes sufficient training and hands-on support to ensure the success of migration to a more efficient solution for ITS application data management.

CleverWorks is built as a client/server solution allowing multiple users to access the system simultaneously while avoiding conflicting edits. CleverWorks supports Active Directory integration for simple management of user authorization and authentication without the need to manage a different set of user accounts.

3.6.1   CLEVERWORKS FEATURE OVERVIEW

CleverWorks is a state-of-the-art core infrastructure component of Clever Devices' ITS system solution. The following is a summary of its major features and capabilities.

CLEVERWORKS MAJOR FEATURES	
Schedule Data Validation	• Provides data integrity checks to ensure a complete and accurate dataset is compiled
Route and Stop Data Management	• Ability to configure, edit, and validate route paths to ensure the most efficient route geo-path is created • Provides for data tracing via geographic map rather than time consuming data collection
Map Window	• View routes, stops and timepoints on Google Maps with satellite and hybrid views • Edit routes and stops without field data collection • Requires no ongoing maintenance costs for map layers

Data Integrity	• Enforces data integrity rules and notifies the user of violations related to:
	  • Import rules
	  • Editing rules
	  • Export rules
	  • Version control

Dashboards	• Dashboards for each module, including data integrity checks • Statistics are automatically updated for each dashboard • Detailed information presented quickly and efficiently • Clear indication of when the dataset is ready to be exported • Activity log of module modifications

AVA Data	• Management of all audio and text announcement data for AVA including:
	   • Next stop
	   • Route and destination
	   • Transfer
	   • Public service (automated and manual)
	   • Maintenance Action Necessary (M.A.N.)

Pre/Post Trip Inspection Data	• Provides the user with the ability to create and manage different pre- and post-trip inspection data by vehicle type • Supports graphics, such as a bus picture, with ability to identify areas on the graphic with damage • Provides a robust set of configuration options at the global level for the inspection report, including an override capability • Failures are sent over the data channel to the fixed end • Creates special tests for the emergency switch, wheelchair system, AVA system, and covert audio • Covert mic can be configured to be tested by automatically routing audio through the device either from the handset, TCH, or PA mic • Configurable to require drivers enter other information such as bus body condition, communication, lights, and overall condition of the bus
Canned Text Messages	• Creates and manages all canned text messages for the operator and for the dispatcher when CleverCAD CAD/AVL is deployed
BusTime RTPI Data	• Management of the data to display in BusTime and on signs
GTFS Export	• Export for Google's General Transit Feed Specification
Geofences	• Supports the creation and management of Geofences in support of • Diesel particulate filter (DPF) • Depot/Garage to notify when the bus is in or out of the garage • Low object warning system • Detecting and notifying when the bus enters and/or exits a Geofence
Export	• With the click of a button, CleverWorks exports data for use by all Clever Devices products ensuring version control

3.6.2 AUDIO MANAGEMENT AND TEXT-TO-SPEECH (TTS)

CleverWorks employs a segmented audio management scheme to efficiently present what is necessary to the user. This system consists of an inventory where all audio can be viewed and previewed. Once an audio record exists within the inventory, it can be assigned to a specific category to serve a unique purpose such as public service, route, stop, transfer, location based, bay, or route/stop prefix announcement. This audio is used by the onboard system to provide AVA (automatic voice announcements) onboard

the vehicle. CleverWorks and IVN support multiple languages as well as natural human voice or TTS. Clever Devices has proposed English text-to-speech as part of our base solution, with a second language as an option.

3.7   BusTime Real-Time Passenger Information

Clever Devices' industry leading real-time passenger information (RTPI) system, BusTime, is a field-proven solution that allows RTS to communicate the operational status of the fleet (predictions) as well as relay public service messages, alerts, and service bulletins such as system delays and emergencies to the public.

The public is more likely to choose public transportation when they have access to BusTime. With easy access through a variety of different media, accurate real-time information, and support of multiple languages, BusTime encourages ridership, improves customer satisfaction, and helps transit passengers reduce their waiting time. To substantiate this, independent research has shown increased transit ridership with the deployment of BusTime RTPI.

BusTime communicates to the riding public through a responsive website using maps and tabular views, free Application Programming Interface (API) for developers, GTFS-RT and Twitter.
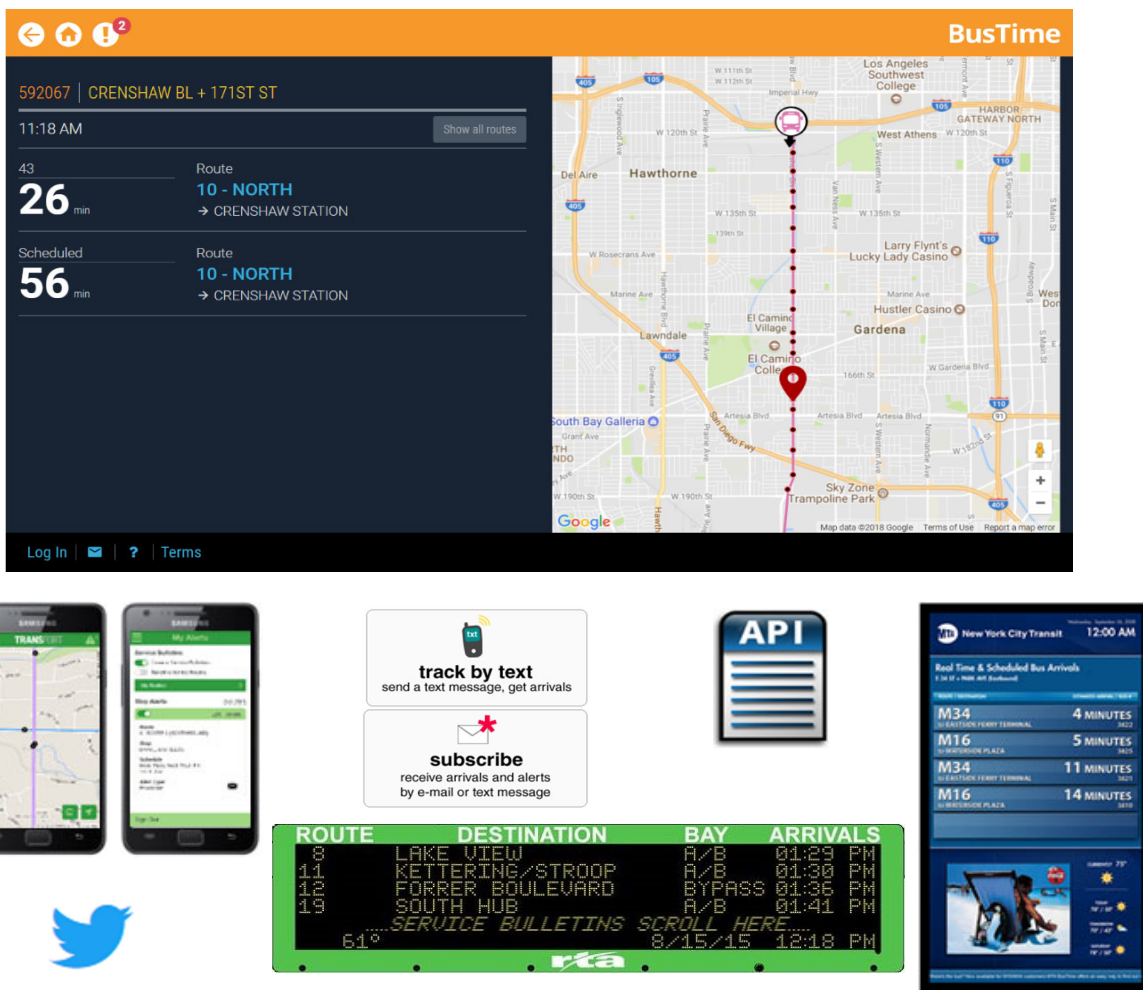

FIGURE 6: PUBLIC ACCESS BUSTIME THROUGH A VARIETY OF MEDIA

Using real-time GPS from the fleet and schedule data, BusTime calculates predictions of all vehicles that will service stops within a configurable look-ahead period, typically the next 30 minutes. BusTime also uses historical data and expert algorithms to improve prediction accuracy on routes that are difficult to schedule or have typically poor performance.

The user accesses the real-time passenger information interactively or in an event driven manner through subscription-based email to mobile devices like smartphones and tablets. BusTime's trustworthy predictions and media -rich access to information allows the public to best use their time and use transit efficiently. The result is confidence and improved customer satisfaction with RTS.

3.7.1   ADVANTAGES

BusTime builds on modern technology with a multi-tier architecture, strategic integration of web-based technologies, feature-rich Google Maps, and expert algorithms. Its contemporary design enhances the rider experience.

The advantage of BusTime to RTS is that it:

- Dramatically increases fleet status visibility with trustworthy predictions
- Affords RTS the opportunity to notify the public of service disruptions, emergencies, and other important messages through service bulletins. It also offers integration to the CleverCAD Disruption Management module to support real-time schedule and route changes
- Supports multiple languages and has been deployed with English, Spanish, Portuguese, and Vietnamese
- Utilizes self-calibrating prediction algorithms and requires no manual configuration or tuning
- Supports interfaces to SMS, IVR, regional 511, Twitter, Google trip planning, and wayside signs
- Supports login authentication using popular social media accounts including Facebook, Google, LinkedIn and Twitter
- Includes a text site that is a JAWS (job access with speech) screen reader and is W3C WCAG 2.0 (web content accessibility guidelines) compliant
- Includes built-in health monitoring via internal checks that, when triggered, notify RTS via email which allows RTS to take corrective action before a problem occurs. This feature provides RTS with peace of mind, knowing that the system is running properly

> *BUSTIME MAKES TRANSIT MORE ACCESSIBLE FOR THE RIDING PUBLIC THROUGH COMMUNICATION.* This ultimately results in increased ridership, more efficient service, and improved customer satisfaction. BusTime enhances RTS' transportation services for its riders by providing trustworthy predictions and maps to show where the vehicle is.

Clever Devices has extensive experience deploying BusTime. We have deployed our system in scores of transit agencies including two of the largest in the United States: Chicago Transit Agency (CTA) and New Jersey Transit (NJT), as well as in some of the smallest: Regional Public Transit Agency (RPTA - Phoenix, AZ) and Ohio State University (OSU – Columbus, Ohio).

Above all, it's your data! We believe that data is the property of RTS, and, therefore, all our BusTime deployments provide open data interfaces for third party access. This open data policy gives developers access to real-time predictions for the development of mobile apps and web sites. This encourages economic growth and provides a significant benefit to your riders at no expense to RTS.

BusTime is a mature RTPI system designed to simplify the daily commute for public transportation users. Unlike traditional schedules, BusTime lets the public see and track the actual status of vehicles along routes so they know when their ride is actually arriving. Instead of waiting at the stop, BusTime helps users spend their time the way they want to - running another errand, finishing a project, or waiting inside to have a cup of coffee.

Increased use of public transit directly affects our environment and society. The use of BusTime improves the safety, reliability, and security of transit services by reaching riders anywhere and anytime with valuable transit service information.

The results are:

Improved Acceptance of Transit:
Improved rider information enables transportation choice decisions and increases the rider acceptance and use of Public Transit. Increased ridership also decreases congestions, creates less dependency on fossil fuels, and improves air quality.

Increased Community Safety and Security:
BusTime reaches riders anywhere and anytime with daily service bulletins and critical emergency information which enhances RTS' role in supporting emergency response.

Increased Rider Satisfaction:
Passengers will be more satisfied with RTS and its ability to provide information that makes their trip easier.

3.7.2 FEATURES AND BENEFITS

BusTime provides many important features and benefits to RTS' administrators as well as to its ridership. The following table shows some of the main features of BusTime that are available to RTS' riders:

TABLE 6: BUSTIME RIDERSHIP FEATURES

BUSTIME IMPROVES RIDERSHIP EXPERIENCE	
Trustworthy Prediction Algorithm	BusTime utilizes patented algorithms that generate accurate predictions and requires no manual configuration or tuning.
BusTime Responsive Website: Easy to use and widely accessible	RTS' service maps, routes, stops, vehicle location on the route, predictions, alerts, and service bulletins are all available in real-time to the public through the Map view and the Prediction Grid. The BusTime website is user-friendly and includes a responsive website which automatically scales to the device screen size in order to support devices that range from smartphones to large screen displays.
Maps:	BusTime capitalizes on Google Maps, and offers riders a familiar interface that includes street views, hybrid views, points of interest, restaurants, etc. The base map is overlaid with a graphical display of routes, stops, and real-time vehicle locations which all provide quick and easy access to predictions.
Text and Email Notifications Know when to leave to catch your vehicle	Using the BusTime subscription service, riders can set alarms to receive advanced notification (an alert) that it is time to leave to catch their vehicle. The alerts are available through the web interface, an email, and a tweet
Free Developer API	BusTime, like all Clever Devices' products, complies with our philosophy that "it's your data". Clever Devices offers a royalty-free BusTime Developer API that is available to RTS and RTS-authorized 3rd party developers. This is also ideal for IVR and 511 system integrations. Our API builds on standards by supporting two formats, JSON and XML, which make it ideally simple to interface with 3rd party products. The data available to all these interfaces includes the block, trip, route, direction, stop, location, predictions, and service bulletins.
GTFS Real-Time	BusTime supports GTFS real-time as a standard output interface. GTFS-real-time is a data interface specification that allows public transportation agencies to provide real-time updates about their fleet to application developers. It is an extension of the GTFS (General Transit Feed Specification), which is an open data format for public transportation schedules and associated geographic information.
Twitter	BusTime supports integration to Twitter so that RTS Twitter users can follow BusTime and receive service updates and timely RTS news.

Some of the main features and benefits of BusTime to RTS are shown in the following tables:

TABLE 7: BUSTIME ADMINISTRATOR FEATURES AND BENEFITS

BUSTIME STREAMLINES CUSTOMER SERVICE	
Administrator Console: Setup and Configuration	The BusTime Administrator Console is an application that serves as the secure user interface for BusTime administrators and dispatchers. The Administrator Console makes configuring, monitoring, and maintaining BusTime easy. Multiple administrative users with varying rights can be configured.
Accuracy Monitor: Tool evaluates accuracy of real-time predictions	BusTime calculates the accuracy of its predictions (in seconds) at whole minute intervals from a stop. The accuracy monitor reports BusTime's prediction accuracy for a given route over a selectable period. This allows for real-time analysis of how well the routes are running under current conditions.
Service Bulletins: Quickly and easily notify the public	BusTime provides RTS with the ability to notify the public of service disruptions, emergency situations, and other public service messages. Service bulletins can be associated with stops, routes, or the entire service. Service bulletins are presented on the website, and digital signage, while also being automatically distributed to Twitter, and email subscribers.
Health Monitor	Built into BusTime are a series of internal checks that when triggered, notify RTS via email, which allows for corrective action before a problem occurs. This provides RTS with peace of mind in knowing that the system is running properly.

3.8 BUSLINK BULK DATA MANAGEMENT

Clever Devices' BusLink is a comprehensive and easy to use suite of applications to manage the transfer of bulk data between IVN and the BusLink server over any wireless IP network, including, but not limited to, WLAN and cellular. All bulk data transfers are fully automatic and require no operator interaction. When the bus comes in range of a valid WLAN network, IVN automatically transfers all onboard performance data to the BusLink server and retrieves all updates from the BusLink server. BusLink is reliable, easy to use, and secure. The following table summarizes the functionality of the five major applications which, together, comprise BusLink. Further details are provided for each of these applications in the following sub-sections.

BUSLINK APPLICATIONS	
Fleet Manager	• Defines and manages vehicles and their assignment to depots • Interfaces with existing maintenance systems • Clever Devices' central repository for bus definition and depot assignment
Authentication Manager	• Establishes a secure connection between BusLink and IVN • Supports automatic transfer of performance data from IVN to the BusLink server • Tracks and reports fleet connectivity and bandwidth utilization
Distribution Manager	• User interface to assign updates to a bus, group of buses or all buses for distribution • Manages and tracks the version of all software and data on the fleet • Keeps the fleet synchronized with the latest version of data
Update Builder	• Creates update packages from a list of files for distribution to the fleet
File Manager	• Manages the performance data uploaded by IVN to the BusLink server

Clever Devices

Terminology:

BusLink:	The comprehensive suite of applications to support bulk data transfer
BusLink Server:	The server-class computer on which BusLink runs

BusLink does the tedious work to distribute updates and retrieve performance data without user interaction. It can be deployed in either of two IT deployment topologies. The first and most common is a centralized solution that supports any fleet size. In this scenario, a single BusLink server provides all the services for the entire fleet. The WLAN network at each depot connects to the BusLink server with sufficiently sized network bandwidth from each depot/garage.

The second IT topology is a distributed server environment. This supports transit agencies that do not have sufficient inter-building network bandwidth for a centralized solution. In this scenario, a BusLink server is located at each operating depot/garage and manages all WLAN communication to the fleet at that depot/garage. This minimizes bandwidth usage to the central data center. In this distributed topology, BusLink affords RTS the ability to manage all bulk data transfers from one of the BusLink servers configured as a master server. This makes management of the bulk data transfers easy by preventing the user from having to log into each BusLink server to distribute updates.

3.9 RIDECHECK PLUS (R+) REPORTING

R+ is a comprehensive ridership reporting solution that is used within transit agencies by APC processing personnel, route and stop planners, schedulers, management, and many other transit personnel. It is designed specifically for transit, supports NTD reporting, and supports Ridecheck data from checker surveys and automated onboard systems. R+ provides an intuitive and easy-to-use graphical user interface (GUI) that affords RTS the necessary tools to manage their data without worrying about managing the tool.

The value R+ provides is in its ease of use, validation, cleansing, matching, and posting to provide comprehensive and accurate reports.

For the fixed-route buses that are equipped with onboard APC systems, R+ pre-processes the automatically collected APC data from the onboard APC system along with the schedule data to validate, match, and correlate the APC data. R+ has an intuitive user interface to configure the pre-processing rules. After pre-processing, the data is stored in the R+ database where the user can apply filters to generate reports for evaluating ridership, and NTD.

R+ also has a comprehensive set of features to support RTS in managing and processing checker surveys for fleets that do not have onboard APC systems. Please see the following pages, "Top Fifty Features of R+," for some additional details related to the features of R+ that are often omitted from other ridership reporting solutions.

R+ is flexible and easy to use. It uses a combination of user-defined filters and reports by which a user can analyze any cross-section of service. Below is a list of the categories of reports available in R+ followed by a common list of specific reports available for each category.

Ridership Reports:	Presentation of information from automated onboard APC systems or checker surveys and includes boardings, alightings, loads, passenger miles, and many other statistics
General Purpose:	Error codes, entity relationship diagrams, discard data etc.

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Ridecheck Plus – Technical Bulletin #31

TOP FIFTY FEATURES OF RIDECHECK PLUS

This technical bulletin lists unique features in Ridecheck Plus, but often omitted from other ridership reporting solutions

Ridecheck Plus is the most widely used ridership reporting software in North America. The software exceeds all other ridership reporting solutions in describing system performance, exposing opportunities for greater efficiency and directing staff in reducing expenses.

DATA CLEANING

Ridecheck Plus cleans incoming APC/AVL/fare data with over sixty business rules, such as isolating a trip where more than 80 persons boarding at a stop or isolating a block with a great imbalance between ons and offs. Clearly describes business rules.

Permits agency to enable or disable the business rules and set the thresholds for corrective action.

Retains incomplete and questionable data, which fail validation, for later analysis

Has tools to retrieve and filter questionable data, such as limiting to a discard reason, a route or group of vehicles over last month

Provides 16 discard reports to aid staff in correcting data issues with incoming APC data, such as listing vehicles with counting issues due to faulty front-door or back-door sensor

Has a built-in viewer to examine and filter the raw APC data as passed by equipment vendor

RIDERSHIP REPORTING

Ridecheck Plus features easy-to-build, user-defined filters to retrieve any cross-section of service

Retains user-defined filters for later use

Select from over 100 reports, both tabular and graphical

Provides key measures, many of which are unavailable in other reporting systems,

As expected, boardings, alightings, load at each stop, max load of trip, passenger miles, revenue miles, revenue hours, boardings per mile, boardings per hour, boardings per trip and patron's average trip length

Serviced stops: percentage stops with ridership activity on a trip

Speed: scheduled, actual and moving speed by segment, trip, route, time period, service period and other groupings.

Segment analysis: boardings, alightings, max load, on time adherence and vehicle speeds from timepoint-to-

timepoint

Running time: both tabular and graphical presentations of running time from timepoint-to -timepoint or across an entire trip, an essential tool for tuning schedules

Load duration: percentage stops on a trip that exceed a prescribed load

Crowding: patrons seated and standing -- with available personal space for standees

Dwell times: duration of time spent at stops, either for a single stop or all stops on a trip
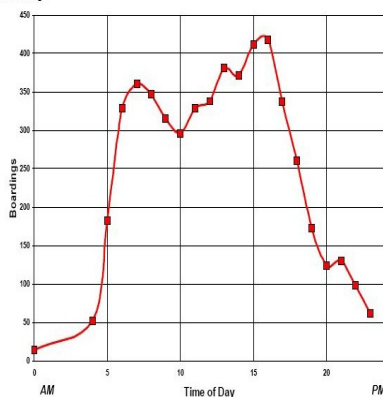
Displays counts for wheelchairs, bicycles, kneels and traffic signal priority when supported by vendor's onboard equipment

Provides time series reports to show ridership across days, months, years and signup periods

Ridecheck Plus has dataviews (onscreen, spreadsheet-like presentations) which export as ASCII text, Access and Excel files

AVERAGE TRIPS

Ridecheck Plus compiles "average trips" in which many observations of same trip on different days are compiled into one composite trip

Average trips turn an unbalanced sample into a balanced representation, such as ridership for a typical weekday, Saturday or Sunday.

Planners and schedulers prefer average trips for analysis and decision-making

Average trips are stored separately from distinct trips; thus, performance is better when users run reports

AIDS TO ANALYSIS

Ridecheck Plus provides APC coverage reports so staff knows which scheduled trips

have and have not been surveyed.

Estimates ridership by month, service and route while adjusting for trips which might be absent from the APC system

Agency defines four route attributes: type, code, class and mode. One attribute might have values of local, express, circulator and park & ride

Ridecheck Plus filters and reports by route attributes

Ridecheck Plus offers extensive treatment for on time adherence,

Agency sets time criteria of before and after scheduled time by which

Ridecheck Plus determines early, late and on time

Always use depart time at first timepoint

Always use arrive time at last timepoint

Use either arrive or depart time at intermediate timepoints of trip

At agency's option, limit on time adherence to published timepoints

At agency's option, use free running at selected timepoints for express routes

At agency's option, use free running at last timepoint for all trips

> Note: Free running is the practice of counting a vehicle as on time or late only; early arrivals are on time

Allows analysis by day-of-week, such a looking at Fridays which may differ from other days in the week

Agency sets calendar dates as "atypical" to treat blizzards, storms and other special days separate from normal service

Allows agency to include or exclude atypical days from average trips.

Allows agency to include or exclude checker surveys from average trips

Agency defines start and end times for time periods. Filter and group by time period in reports
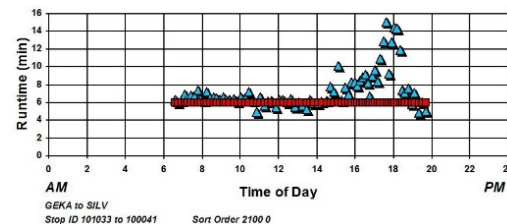
Preserves unknown stops as passed by equipment vendor, or merge with previous stop or matches to closest known stop

![Clever Devices]

Ridecheck Plus – Technical Bulletin #31

Statistics by Route
Jun13 (Weekday); avg

| Route	Trips	Board	Alight	Boardings Per Mi	Per Hr	Per Trip	Trip Runtime (Min) Sched	Actual	Dwell (Min)	Timepoint Observations On	Early	Late	Ontime	Serviced	Max Load Patrons	Seats	Load Duration 70%	100%	Ramp Event
1: HOSPITAL	137	4,866	4,846	2.09	24.8	35.5	86.0	76.6	12.2	899	256	218	65.5%	28%	40	104%	3.9%	0.6%	430
2: BELLAIRE	164	7,957	7,930	2.94	34.1	48.5	85.4	74.0	13.6	1,006	259	183	69.5%	38%	43	113%	8.4%	1.0%	397
3: LANGLEY / W GRA	85	1,755	1,748	1.21	15.6	20.6	79.3	71.5	9.9	507	96	169	65.7%	21%	21	55%	.	.	194
4: BEECHNUT	129	4,622	4,600	2.01	29.2	35.8	73.7	64.9	9.3	663	92	148	73.5%	29%	36	95%	5.7%	0.7%	281
5: SOUTHMORE / KA	105	4,224	4,214	1.68	20.9	40.2	115.2	105.1	17.2	893	246	270	63.3%	22%	32	85%	0.4%	.	273
6: JENSEN / TANGLE	81	2,445	2,423	1.28	18.1	30.2	99.9	91.0	12.8	493	94	136	68.2%	21%	34	90%	1.7%	0.2%	191
8: SOUTH MAIN	88	3,130	3,119	2.19	29.0	35.6	73.6	69.0	11.2	431	88	97	70.0%	31%	47	124%	8.0%	1.3%	161
9: N MAIN / GULFTON	74	2,759	2,757	1.65	20.9	37.3	107.2	98.2	14.4	427	76	160	64.4%	25%	40	106%	1.0%	0.1%	126
10: WILLOWBEND	75	1,264	1,256	1.87	24.0	16.8	42.0	35.0	3.9	242	40	18	80.7%	22%	40	106%	0.9%	0.2%	87
11: NANCE / ALMEDA	70	2,448	2,434	1.88	23.9	35.0	87.6	79.6	12.7	462	105	147	64.8%	25%	33	88%	2.3%	0.2%	160
14: HIRAM CLARKE	141	2,552	2,537	1.96	24.8	18.1	43.8	35.9	3.3	549	112	41	78.2%	25%	32	85%	1.8%	0.2%	264
15: FULTON	110	2,332	2,320	2.77	26.0	21.2	48.9	32.5	5.9	275	50	55	72.4%	32%	33	87%	1.0%	0.1%	178

Ridecheck Plus reports many statistics for routes (above), patterns, trips, stops, time periods or services.

Supports a common sort order across all patterns for a given route, direction and signup. This feature allows presentation of ridership by stop in travel order which is unavailable in other reporting systems
Supports trip sorting by scheduled start time or control point – a major timepoint common to all patterns for a given route and direction
Has optional GIS Module for geographic analysis of boardings, alightings, load and on time adherence. Other reporting systems require a batch export from the ridership system and batch import to GIS system
Ridecheck Plus is integrated with ArcMap product for seamless application of user-defined filters to retrieve ridership data for the cross- section of service under investigation

SYSTEM FEATURES
Ridecheck Plus is an open system. All users can export information
Retains ridership information down to stop level for as long as the agency deems useful, such as 3, 5 or 10 years
Database schema resides on either SQL Server or Oracle in most instances; Access is available too
Prints blank survey forms to paper for data collection by checkers or professional staff
Offers handheld software to automate data collection by checkers
Has reports with APC surveys side-by-side with checker surveys – great to calibrate and build confidence in an APC system
Provides several reports to report operator performance, such as on time adherence at the block, trip and timepoint levels
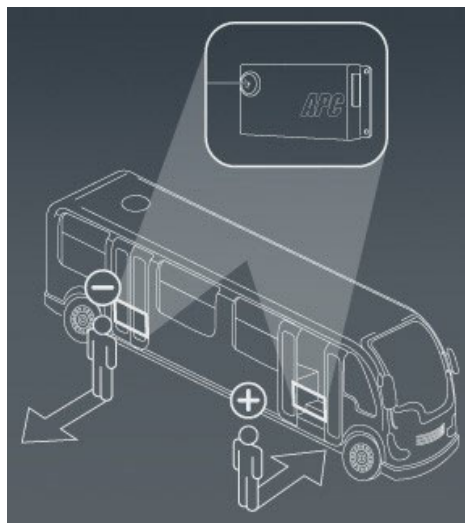
Provides reports to manage stop amenities, such as placing benches and shelters at stops with the greatest boardings
Has an optional farecheck feature to track fare payment side-by-side with APC counts
Has an optional parkcheck feature to track utilization of parking lots
Considers features specific to individual APC vendor, such as off-route transactions and blocked sensors when supported by equipment vendor
Integrates with commercial scheduling systems, such as Hastus and Trapeze, GTFS
Preserves the service designation in the agency's scheduling system (e.g. Weekday, Saturday, Holiday)
Preserves the trip id designation of the agency's scheduling system for audit tracking
Accommodates agency's stop id convention, rather than equipment vendor's stop id
Provides tools to tune the back-end database from the front-end application, unlike other ridership reporting systems
Ridecheck Plus has a processing log to track progress of each routine in nightly processing of APC data
Sends an email to selected recipients upon failure of nightly processing due to data issues, code issues or inadequate resources in the back-end database
Supports common Windows operations on forms, such as on-the-fly sorting, filtering and searching on key word
Has built-in PDF driver and email client, so users can send reports as PDF documents. Provides automatic updates of the client application to all workstations
Supports extended attributes for stops which list pavement, curb cuts, ADA compliance and other stop characteristics from a third-party stop inventory system
Does NTD reporting of boardings and passenger miles for US agencies in securing formula funds from the FTA

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3.10   AVM

Clever Devices' Automatic Vehicle Monitoring (AVM) is an enterprise, web-based business intelligence reporting solution that will allow RTS to optimize its fleet maintenance strategy through intelligent decision-making tools. Its goal is to provide RTS insightful information of the fleet's onboard equipment health. This affords RTS the opportunity to address impending failures before they become critical, resulting in a cost effective — "just-in-time" — maintenance program.

AVM accomplishes this by processing, analyzing, and reporting on thousands of fault and performance data points collected by the onboard Intelligent Vehicle Network (IVN). IVN monitors the existing vehicle's SAE J1708 and J1939 networks that can include data from the engine, transmission, brakes, batteries, heaters, HVAC, camera, hydraulics, air, wheelchair, door, multiplex system and many more. This wealth of raw data is maintained in a centralized AVM data warehouse where it is further analyzed, displayed, and ultimately used as an information-based decision-making tool on the maintenance strategy.

Unlike most systems on the market, AVM doesn't simply collect and report data in the format received with minimal or no processing. AVM processes, analyzes, and presents the data in a means that allows maintenance personnel to act on the results. As an example, a differentiating factor of AVM is its effective ability to combine relevant fault data with performance data to gain a much higher level of knowledge of the health of a component, vehicle, or vehicle type with the "Fault IQ". AVM's Fault IQ is a patented algorithm that combines the number of faults, duration of faults, fault severity, fault age and fleet duty cycle to represent the health of the vehicle, vehicle type, or component in a leveled 0-100 score system. AVM users can filter the important data from the not so important data, visualize it, understand the behavior, diagnose the condition, document it, and make informative just-in-time run/replace/repair decisions.

> **AVM** is like having a mechanic with a laptop connected to *every system* on *every vehicle*, 24 hours a day, 365 days a year.

3.10.1   BENEFITS

AVM is like having a mechanic with a laptop connected to every system on every vehicle, 24 hours a day, 365 days a year. Our AVM system provides detailed maintenance and vehicle health information that allows maintenance staff to respond more efficiently and effectively to issues before they turn into road-calls and service interruptions. With AVM, RTS can complement or transform your maintenance process from a preventative (periodic checks) and reactionary (reaction to breakdowns) mode, to a revolutionary cost effective "just-in-time" maintenance program. Benefits include:

Maintenance Task Time Reduction	AVM improves the time required to complete repairs by significantly reducing and, in some cases, eliminating the time spent diagnosing defects. AVM defect reports contain all the relevant information mechanics require to understand the defect and begin repair activity. Additionally, AVM ensures that the correct diagnosis is made initially, and that other active and contributing defects are captured and reported at the time of the scheduled repair.
Reduction in Road Calls	RTS will be able to stay in front of defects that, if left undetected, can cause costly road calls and inconvenience for your customers. AVM will give RTS the ability to significantly reduce the number of road calls, changeovers, and service interruptions. As RTS vehicles return to their garages, AVM will automatically

download any defect data and flag vehicles with critical defects. RTS service personnel can easily use the data to triage these vehicles, proactively address the defects, and prevent vehicles from entering service with defects and, therefore, prevent service interruptions.

Warranty Recovery	With AVM, RTS has the data and analytic evidence to conclusively prove that a component defect may be the fault of the manufacturer and not the responsibility of the transit agency.
Saves Time	AVM does the work for you. AVM automatically send reports based on user configurable business rules to identify critical faults and periodic maintenance activity. Maintenance personnel use this to minimize the amount of time manually searching for faults and generating reports.
Self-Tuning Thresholds	With our new prognostics feature, AVM dynamically changes thresholds that create faults to the current operating conditions. This minimizes, if not eliminates, the need to manually reconfigure fault thresholds.

3.10.2 FEATURE OVERVIEW

The following is an overview of AVM features. Additional information is provided in the subsequent sections.

Easy to Access Web Application	AVM is a web application and requires no installation of client-side software. This means it is available over the RTS intranet or available to RTS authorized external users via the internet using any web browser (for example Internet Explorer, Google Chrome, Mozilla, Safari.)
Powerful User Interface	AVM data is presented in an intuitive user interface that allows RTS to categorize and visualize AVM data by vehicle type/manufacturer, component (equipment type), garage/depot, and vehicle ID. This allows the user to quickly gain an understanding of where the issues are. Each category, or "tile" has an attribute label from the selected category and a six-segment 0-100 "Fault IQ" meter that populates based on the cumulative score for the displayed tile. Further interrogation allows the user to drill down to view more detailed and supportive information such as:

- Vehicle Duty Cycle statistics
- Hyperlinks to OEM customer portals
- Lamp Status & Fault Codes
- Fault details
- Recent faults

Intuitive Dashboards	AVM comes standard with a comprehensive set of built-in dashboards that utilize data from multiple reports to provide a high-level comprehensive view of the targeted key performance indicator. Dashboards include:

- Fault Explorer
- Mechanic Current Month
- Transmission
- ABS and Brake
- Foreman Rollout
- Max/Avg/Min Performance
- Fleet
- Garage
- Engine
- Foreman Current Month
- Roll Out
- Fault Explorer

Comprehensive Reports with Ad	AVM has more than 100 standard reports to aid the user in prioritizing maintenance, finding trends, and analyzing specific conditions. These reports

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Hoc Report Generator	start at a high-level (by depot, by fleet type, by component type, etc.) to very detailed (bus specific and component specific).
	AVM includes a full featured ad hoc report builder allowing users to modify existing and create new AVM reports. In addition, the data is stored in a MS SQL Server data warehouse allowing users to create custom reports with external reporting tools such as Crystal Reports.
	Sharing reports is easy. A user can export reports in multiple formats including Excel, Word, HTML, and PDF.
Intelligent Automation	AVM is user configurable to distribute reports via email either on demand, on a scheduled basis, or when a reporting threshold is crossed. This feature is ideal to minimize time searching for critical information and generating reports
Rich set of OEM Component Monitoring	Our onboard IVN interfaces with the vehicle OEM components by way of available J1708, J1939 and Ethernet to monitor 1000's of component faults and performance data. Examples include engine, ABS, transmission, HVAC, multiplexed systems, ITS components (fareboxes, APCs, video surveillance systems, others).
	Clever Devices and RTS will mutually agree upon the set of OEM equipment and data points to monitor based on available interface to vehicle components.
Flexible Configuration	AVM is configured at the fixed end to identify the specific faults and performance data to collect, the severity level (warning, fault, etc.) by vehicle type, as well as a suite of over 30 algorithms specifically designed for transit applications.
	Distributing AVM configuration changes to the fleet is easy, reliable and tracked through Clever Devices' BusLink.
Prognostics	To understand when a vehicle is performing differently relative to other vehicles of the same type, AVM includes Prognostics. This helps to identify vehicles that are exhibiting or about to exhibit a defect.
	AVM is configurable to continuously calculate norm values over a specified period for performance data point at a bus type level. These new bus type norms are automatically sent to IVN via WLAN and used to create faults based on deviation from the bus type data point norm.
Operator Real-Time Fault Awareness	For vehicles equipped with IVN's Transit Control Head (TCH), AVM is configurable to enable the AVM status display indicating fault description, severity, and count (number of occurrences).
AVM CAD Events	AVM is configurable to have IVN send faults to Clever Devices' CleverCAD system, for real-time presentation to dispatchers.
Automatic Data Processing	When the vehicle returns to the garage/depot, the collected set of fault and performance data is automatically uploaded to the fixed-end and ingested into the centralized AVM data warehouse using WLAN and our BusLink bulk data transfer solution.

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3.11   DATA SERVICES
Annual Database Maintenance with Database Administration, QA Testing and Deployment Services

Clever Devices has included the data services for three (3) picks per year for using the Clever Devices data management products. Clever Devices will update the Gainesville RTS' CleverWorks database from the currently installed fleet database. The data services include processing schedule data, spatial and AVA changes on stops and routes, quality assurance testing, database deployment to the fleet and fixed-end systems, and support from project management and systems engineering.

These changes can include:
- Audio processing (up to 100 phrases)
  - The services of recording audio files for announcement changes that are required based on the changes route, stop, PSA, and other AVA data that is provided by Gainesville RTS. Clever Devices will provide the audio voice talent. Clever Devices will make best efforts to contract the same voice talent as the existing recordings.
- Schedule data processing using a data export out of the RTS existing scheduling system
- Stop changes (up to 15% of total stops in database)
  - Stop description update
  - Transfers
  - Audio update
  - Inside sign text update
  - Stop description update
  - BusTime text update
- Route variations (or pattern) changes (up to 15% of total route variations in database)
  - BusTime text update for destination
  - Destination code update
  - Audio update
- 25 PSA changes
- 10 canned message changes
- 100 location-based announcement changes (LBA)
- Project Management support
- Systems Engineering support
- Quality Assurance (QA) testing of the Database before distribution to the fleet and includes:
  - Login and run a sub-set of routes
    - Weekday Routes
    - Weekend Routes
    - Holiday Routes
    - Remote login Functionality
- Database Deployment
  - Export from CleverWorks and distribute to the vehicles using BusLink bulk data management software and the existing RTS WLAN infrastructure
  - Gainesville RTS' technicians will be responsible for updating straggler buses.

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Notes:

1) Changes exceeding 15% of total stops and corresponding routes, per pick change, will require negotiation between Gainesville RTS and Clever Devices. Prior to the data work commencing, Gainesville RTS will provide their schedule file export which will incorporate changes made by Gainesville RTS for schedule changes and changes for up to 15% of total stops on existing routes.

2) The schedule file export along with required documentation e.g. route / stop changes, destination sign changes, path turn by turns or shape files and all other relevant information will be provided to Clever Devices 4 weeks prior to the schedule / database activation date.

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4   PRELIMINARY PROJECT SCHEDULE

Clever Devices considers the information in this section to be confidential/proprietary. Therefore, as requested by RTS, we have removed it from this document and submitted it in a separate document solely for confidential information. Please see the accompanying document.

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5 RTS PROJECT RESPONSIBILITIES

One of the many key aspects to a successful project is a clear definition of roles and responsibilities. It is very important that there is a clear communication between Clever Devices and RTS to ensure a successful deployment of the project. To that end, listed below are RTS' responsibilities to help ensure this success. Depending on the final contract Statement of Work, this list may change to meet additional project requirements.

1. Assemble a project team including a project manager and a technical lead who will have the ability to coordinate and make decisions on behalf of RTS.
2. Assign champions and user representatives from various scope areas including Maintenance, Operations, Marketing (for RTPI), IT, Scheduling, Database and System Maintenance (post deployment), etc.
3. Ensure all relevant project team members participate in periodic project status conference calls, attend all project meetings such as the on-site operational assessment, requirements review and design meetings so that the project stays on schedule
4. Participate in design meetings and provide approvals
5. Provide support in the scheduling of training and related logistics and ensure that necessary staff participates in training sessions
6. Participate in all stages of testing and provide approvals
7. Report problems using standard format agreed at the onset of the project
8. Provide basic infrastructure (power, workspace, access to facilities, equipment storage area, suitably equipped training room) required at each facility for installation of the system and provide support in coordinating logistical arrangements for receipt and storage of project-related equipment into project facilities
9. Provide accurate documentation of current implemented work rules, actual business practices, payroll rules, reporting requirements, interface requirements, and any pertinent business requirement information
10. Provide timely review (in accordance with the project schedule), comment, and approval of all requisite documentation
11. Provide data that produces error-free output to be consumed by the ITS solution. RTS is responsible for addressing any data anomalies identified by our data integrity checks
12. Provide route and stop information by pattern which includes accurate stop locations (latitude and longitude coordinates)
13. Provide a complete list of all vehicles types (including in service vehicles and spares), including vehicle numbers, year, make and model, mechanical sub-systems (including make and model), schematics, seating capacity (jump seats, wheelchair positions, etc.)
14. Coordinate and provide vehicles to and from the equipment installation location and provide a driver/s to support installation test and field test as part of test procedures
15. Provide access and involvement of a mechanic(s) with a high-level of knowledge of each vehicle type to provide bus technical support, access to bus design documentation and knowledge of equipment configuration for each bus type to support the equipment installation design by Clever Devices' application engineer
16. Utilize the IT guidelines and security policies identified or agreed upon during the Design Phase of the project
17. During the design phase, Clever Devices will work with RTS to clearly define the networking configuration of our proposed ITS solution. The ITS functionality, communications, and networking may require minor changes to your existing IT guidelines and security policies, such as providing access for our applications and support, including opening the firewall as necessary

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18. Provide Clever Devices remote access via VPN or other secure solution to the workstations for support of administration, configuration, deployment, and support of the system

19. Provide necessary permits or permissions for any activities requiring outside authorization

20. Please note that the GFI farebox requires a cable to be installed from the farebox to IVN. RTS will be responsible to install this cable, as there are safety issues with getting under the bus

21. All references to Clever Devices interfacing with existing systems are predicated on the assumption that the respective system is functioning properly. RTS is responsible for ensuring all existing or 3rd party software, systems, components and equipment are functioning properly and to manufacturers' specifications during all phases of the project and are being actively supported by the original developer/manufacturer at the time of project deployment. If this is not the case, it is presumed that RTS will work directly with its provider to resolve any issues

22. Provide cellular service for the ITS system and public Wi-Fi. The bandwidth estimate is as follows:
    o   ITS solution   50 MB/month/vehicle
    o   Public Wi-Fi   Unlimited or largest available

23. If desired, provide service to limit Public Wi-Fi access to prevent overages and excessive use

24. For public Wi-Fi, provide content filtering service to prevent access to undesirable web sites

6   TRAINING

At Clever Devices our training approach is quite simple – start training at the beginning of system installation and continue training with more detailed and advanced product user information throughout project deployment on into the warranty period. This will allow the end users to learn how the product works and operates at their pace without overwhelming them. It also allows us the opportunity to work closely with the end users, provide needed one-on-one hands on training and answer their questions. In the end, our goal is to have your users become the experts when using Clever Devices' products. Clever Devices will provide training for RTS' dispatchers, operators, IT personnel, maintenance personnel, and administrators. Training will take place at RTS' facility (live and WebEx sessions).

To support our comprehensive training program, Clever Devices will provide the Installation and Testing Plan early on in the project for RTS' review and approval. The training plan will detail the scope, schedule, course content, training time requirements, and recommended attendees. Later in the project, we will deliver the required training documentation prior to conducting that particular training session. Our training materials will cover every function available to RTS' users. Training will be delivered by experienced Clever Devices representatives and will adhere to all training course requirements needed to ensure the end users fully learn how to operate, administer and maintain the ITS Systems.

Clever Devices uses an objective-based education approach for instructional design. We use the ADDIE model for analyzing the outcome needed, and we then design and develop the course contents and materials to support the objective. The **ADDIE model** provides a structured method to ensure that learning objectives are met. The model takes the training developer through the following steps in a closed loop fashion: **A**nalysis, **D**esign, **D**evelopment and **I**mplementation, with each of these steps closely linked to an **E**valuation method to ensure that the training is reviewed at each step of the process. With this approach, we focus on the job function of each type of student and organize the training to maximize their ability to perform these job functions efficiently and accurately. Clever Devices' Training Department Head will collaborate with the RTS project manager to finalize and adjust the training schedule. It will be the responsibility of RTS management to schedule RTS personnel to attend these training sessions. Our experienced trainers are proficient in the use of the proposed solution and have proven to obtain the training and learning results that our clients desire.

The student's ability to perform job related tasks will be used to demonstrate successful completion of the training. Clever Devices' products are intuitive to use; therefore, operations staff are not required to spend large amounts of time in training. Most modules can be taught in half of a shift. Our lesson plans will be carefully reviewed to ensure that safety is properly addressed, and that system security is not compromised. Clever Devices will require the following resources from RTS:

- A room to deliver on-site training courses
- Projector and screen/display
- Network and application access for Trainer
- Computer workstations for each student to run the BusTime, CleverCAD, and CleverReports applications
- Computer workstations with CleverCAD must have internet access
- A vehicle is required for the Equipment Maintenance and Vehicle Operator courses
- List of student names for each class
- CleverReports and Ridecheck Plus courses require a minimum of a 30 days of captured data

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6.1 EVALUATION PLAN

Clever Devices' training is driven by the objective that attendees must be able to use technology to solve transit operation challenges. As described above, the ADDIE model includes evaluation at each step of the process from analysis through execution. Our training integrates assessments throughout its training regimen. Lesson plans include practical exercises and direct skills checks where appropriate to ensure that students not only understand the lesson content but are capable of consistently exercising the lessons in practice. Assessments are designed to assist the instructor in determining the appropriate point at which to progress to the next learning objective.

6.2 DELIVERY METHOD

Clever Devices uses a variety of delivery methods according to the needs of the individual classes. These methods are integrated into the lesson plans themselves. For example, if lecture and PowerPoint are used in a lesson's plan, the speaker's notes are embedded in the PowerPoint presentation itself. Clever Devices will provide adequate notice for preparation of space for all training. Note that multiple methods may be used within a given course. These methods are identified in each course syllabus and may include:

- Lectures using PowerPoint presentations
- Hands-on workstation usage utilizing the actual installed software on location and the RTS network
- Scenario resolution in the form of either group or individual exercises
- Question and answers on specific learning objectives
- On-the-job training during system installation and troubleshooting

6.3 STUDENT CATEGORIES

Trainees are divided into categories: Managers, System Administrators, Supervisor/Trainers, Dispatchers, Mechanics, Schedulers and Planners, Information Technology, and Vehicle Operators. For training purposes, these categories are defined as follows:

- Managers: senior supervisory staff in need of high-level understanding of the Clever Devices product suite
- System Administrators: personnel responsible for maintaining user functional and feature level access for the respective components for the Clever Devices product suite
- Schedulers and Planners: personnel responsible for the transit authority schedule and run cutting
- Information Technology: personnel responsible for the hardware, software and network infrastructure
- Supervisors: depot supervisory personnel responsible for assisting operators, swapping equipment and reporting problems to maintenance personnel
- Dispatchers/Controllers: vehicle dispatchers/controllers and dispatcher/controller supervisors
- Maintenance: maintenance personnel such as mechanics for all relevant vehicle types (e.g., buses, rail, trolleys, paratransit)
- Operator Trainers: personnel responsible for delivering Clever Devices training to transit authority vehicle operators
- Marketing: personnel responsible for communicating with the riding public via website and signs
- Customer Service: personnel responsible for communicating and supporting the riding public real time

6.4 COURSE TO STUDENT TYPE MAPPING

The following table defines which trainee types will be trained on each course. Clever Devices will work with the RTS project manager to review and modify the following table prior to the start of training as part of training schedule development.

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TOPIC	MANAGER	SYSTEM ADMIN	PLANNERS / SCHEDULERS	ITS	SUPERVISOR	DISPATCHER	MAINTENANCE	OPERATOR TRAINER	MARKETING	CUSTOMER SERVICE
Vehicle Operator Trainer Training					Y			Y		
Equipment Maintenance Training					Y		Y			
IT Support Training	Y			Y						
BusLink Administrator Training	Y			Y						
CleverCAD User Training	Y	Y			Y	Y				
CleverCAD Administration Training	Y	Y			Y					
CleverCAD Lite User Training	Y	Y	Y				Y		Y	Y
CleverReports User Training	Y				Y					
CleverReports Administrator Training		Y								
BusTime User Training	Y	Y			Y	Y				Y
BusTime Administration Training	Y	Y			Y				Y	
CleverWorks Training	Y	Y	Y							
CleverWorks Support Training	Y	Y	Y							

TOPIC	MANAGER	SYSTEM ADMIN	PLANNERS / SCHEDULERS	ITS	SUPERVISOR	DISPATCHER	MAINTENANCE	OPERATOR TRAINER	MARKETING	CUSTOMER SERVICE
Ridecheck Plus APC Training	Y	Y	Y							
AVM Training	Y	Y					Y			
Refresher Training	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

6.5 TRAINING COURSE SYLLABI

An overview of the proposed training courses is provided below, including a description, intended audience, course duration and prerequisite information.

6.5.1 VEHICLE OPERATOR TRAINER TRAINING SYLLABUS

Audience	Supervisors or trainers responsible for training vehicle operators
Duration	3 hours
Prerequisites	Familiarity with vehicle operation, dispatch operations, safety policies, third-party bus equipment and transit agency business rules; training experience a plus
General Objective	To enable students to be able to fully understand all controls, events and operate the MDT.
Overview	This instructor-led course will be a classroom and lab style training session. The training will be conducted with a simulator and/or on vehicles with "live" equipment. Instruction will be provided enabling the attendees to conduct operator training of the onboard equipment to vehicle operators. The first portion of the class provides an overview of the training methods to be used and the instructor training objectives. Presentation of the course content is covered for the mobile data terminal operations to gain a familiarity with the controls. In the second portion, scenarios for common events are presented. Next, methods of instruction for onboard hands-on, practical training are given. Finally, student assessment is explained including testing and evaluation procedures. Clever Devices trainer will train the RTS Operator trainer, then after some time to study the material and practice, the RTS Operator Trainer will deliver the class to students as well as the Clever Devices trainer. This will certify that the RTS trainer will be successful in their future training sessions.

Topics

- System overview including onboard equipment
- Logging on in both schedule (automatic) and manual modes
- Accessing schedule information and stop information for selected runs
- Voice and data communications between vehicles and CleverCAD users
- Emergency Alarms
- Communicating with passengers
- Destination sign changes
- Navigation screens

Documents Utilized	Vehicle Operator Instructor Manual, Vehicle Operator Student Workbook, and Vehicle Operator Quick Reference Guide
Location (s)	RTS training facility

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6.5.2   EQUIPMENT MAINTENANCE TRAINING SYLLABUS

Audience   Maintenance personnel responsible for RTS vehicles

Duration   5 hours

Prerequisites   Knowledge of electronics and electrical test equipment, familiarity with maintenance of bus electronics and Windows computer operations.

General Objective   To enable the trainer to teach students to diagnose and trouble shoot problems with onboard hardware in the field and how to get non-conforming material returned for repair or replacement.

Overview   This instructor-led course will review diagnostic and debugging techniques to allow students to isolate problems, repair, remove and replace the Clever Devices hardware on vehicles. Additionally, the course will outline and explain the capabilities of the IVN system including IVN diagnostic features, setting parameters through the operator's interface, and analysis of fault data for diagnosis and evaluation. The first two hours are conducted in a classroom setting to provide an overview of the equipment, safety procedures, theory of operation, and overview of diagnostic procedures, overview of maintenance and installation documents, and approach. The balance of the day is a combination of laboratory style hands-on training and question and answer interaction.

Topics
- IVN Diagnosis and Troubleshooting
- BusWare diagnostic and testing screens
- Wiring harness
- Discrete Inputs
- TCH
- SpeakEasy-2
- Destination Headsign
- Farebox integration
- Internal Signs
- Subsystem communication troubleshooting
- Non-conforming material return procedure
- Engine
- HVAC
- Transmission
- Climate control
- IVN
- ABS Brake system
- Document Use
- Maintenance Checkout Procedure
- Installation Manual
- Non-conforming material return procedure

Documents Utilized   IVN Equipment Maintenance Instructor Manual, IVN Equipment Maintenance Student Workbook

Location (s)   RTS provided centralized training facility

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6.5.3   IT SUPPORT TRAINING SYLLABUS

Audience	System Administration staff and IT personnel responsible for the oversight of the system
Duration	1-2 hours
Prerequisites	Advanced IT system knowledge
General Objective	To enable students to perform system backups, monitor system performance, perform first tier support and troubleshooting and assist second tier support for the applications and supporting infrastructure of the Clever Devices system deployment.
Overview	This is an instructor-led course for technical support and system administration staff that will be supporting Clever Devices' IT systems. Topics include the network topology, computing platforms, operating systems, storage, data flow, database structure, diagnostics, system utilities, data backup, system health monitoring, facilitating remote support, preventive maintenance and interfaces to related 3rd party systems.

Topics

- Network topology
- Configuration and communications of the computer subsystem, dispatch consoles, yard workstation, Supervisor tablets, WAN, LAN, and wireless LAN
- Troubleshooting
- System backup
- Interpreting and responding to messages generated by error-monitoring software
- Failing over to backup servers and devices (if applicable)
- Restoration of equipment and data after failure

- Management of system access, security features, user accounts and passwords, and user privileges
- Installing software updates provided by the Clever devices and 3rd party software suppliers
- Use of software configuration management and administration tools and system test tools
- Management and maintenance of the wireless LAN and associated hardware
- Facilitating remote support
- Problem reporting
- Preventive maintenance

Documents Utilized	PowerPoint presentations, system architecture and network diagrams
Location (s)	RTS provided centralized training facility

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6.5.4 BUSLINK ADMINISTRATOR TRAINING SYLLABUS

Audience	System administrators and supervisors
Duration	1 hour
Prerequisites	Basic to advanced knowledge of Microsoft Windows and RTS' business process for data release or pick release
General Objective	To enable users to understand, operate and manage all functionalities of BusLink systems that work collaboratively with the IVN and all system components
Overview	The BusLink software product and its features are taught by an instructor. This class is delivered using actual situations to reinforce the material delivered. The use of BusLink for distributing data updates to the fleet will be taught. This course is taught in combination with the IT Support Training course.

Topics

- System Overview
- Components
- Architecture
- User Interface
- Building Distributions
- Scheduling Distributions

Documents Utilized	BusLink system guide, PowerPoint presentation
Location (s)	Delivered via WebEx by Clever Devices' IT Deployment team member

Clever Devices

6.5.5   CLEVERCAD USER TRAINING SYLLABUS

Audience   Dispatchers/Controllers and Supervisors responsible for CleverCAD CAD/AVL operations

Duration   6 hours

Prerequisites   Knowledge of Microsoft Windows; familiarity with RTS operations. For Incident Management section, planning analysis and documentation of internal incident-related processes should be complete.

General Objective   To enable the trainer to train students to use CleverCAD to perform all of the supported operational use scenarios including all software functions and displays.

Overview   This instructor-led classroom training is designed for dispatchers/controllers, customer service and help desk personnel who are responsible for CleverCAD CAD/AVL operations. The course covers a complete system overview and explanation of all CleverCAD functions used by dispatchers/controllers and supervisors. The course includes lecture and hands-on practical training.

Topics
- Introduction to the CAD interface and map features
- Work Assignments – Using grid views to manage and monitor work assignments
- Monitoring vehicles – Using the system to view and action schedule events and vehicle status
- Communications – Using the system to create and monitor text and voice communication with vehicles and other users

- Event Management – Using the system to manage events, emergency alarms and incidents
- Historical Data – Using playback function to access and communicate historical data
- Incident Management – students will learn how to create and modify incident reports, and assign to others following their internal processes

Documents Utilized   The CleverCAD User Guide accessed via application

Location (s)   RTS provided centralized training facility

Clever Devices

6.5.6   CleverCAD Administrator Training Syllabus

Audience	Administrators responsible for on-going maintenance of a CAD suite
Duration	6-8 hours
Prerequisites	CleverCAD User course; basic to advanced knowledge of Microsoft Windows; familiarity with RTS operations; experience in LAN environment on setting up user groups and security levels for users
General Objective	To enable students to use the CleverCAD system that functions together with the MDT and to perform all of the supported operational use scenarios including all software functions and displays
Overview	This instructor-led classroom training is designed for system administrators responsible for the on-going maintenance of the CleverCAD system. The training will cover a comprehensive review of the entire system. It will cover the basics of functions performed by dispatchers or controllers. These functions include use of map tools for viewing incident location, as well as all additional map data. The training will include a comprehensive explanation of the pending incidents window, which displays incidents requirement dispatch and the status of those incidents.

Topics

- CleverCAD User Course
- Overview of CADministrator functions
- Vehicle Management - Understand how to add vehicles to the system and remove them from the system
- Employee Management - Understand how employees are added to the system and the permissions assigned to groups
- Event Management - Understand event configuration and how the event configuration impacts the rest of the CleverCAD system
- Incident Management - Creating and managing the forms that are used to collect information relative to an incident

Documents Utilized	The CleverCAD System Admin User Guide is accessed via the application
Location (s)	RTS provided centralized training facility

Clever Devices

6.5.7 CLEVERCAD LITE USER TRAINING SYLLABUS

Audience	RTS customer service, marketing, maintenance and/or planning personnel
Duration	2 hours
Prerequisites	Knowledge of Microsoft Windows; familiarity with RTS operations, for the Incident Management section; planning analysis and documentation of internal incident related processes should be complete
General Objective	To utilize relevant functionality of the CleverCAD application
Overview	This instructor-led classroom training is designed for transit personnel who may not use the full suite of CleverCAD functions. Examples include maintenance personnel who need to locate vehicles without the need to contact controllers or dispatchers, customer service personnel who also need to locate vehicles or utilize the playback functionality to investigate customer issues. The course includes lecture and hands-on practical training.

Topics

- Introduction to the CAD interface and map features
- Monitoring vehicles – Using the system to view and monitor vehicle status
- Communications – Using the system to communicate with other users

- Incident Management – Using the system to utilize Incident Management
- Historical Data – Using playback function to access and review historical data

Documents Utilized	The CleverCAD User Guide accessed via application
Location (s)	RTS provided centralized training facility

Clever Devices

6.5.8   CLEVERREPORTS USER TRAINING SYLLABUS

Audience	Applications and systems administrators
Duration	2 hours
Prerequisites	Basic to advanced knowledge of Microsoft Windows
General Objective	To enable students to be able to fully understand, operate and manage CleverReports
Overview	This is an instructor-led course covering the use and operation of CleverReports functionality. Topics include dashboards, key performance indicators, graphic reports, tabular reports, setting up favorites, configuring report emailing, drilling down into data. The course material is presented with a combination of slides and live software screen demonstration. Formal instruction includes hands-on, practical learning on the system software coupled with question and answer interaction throughout.

Topics

- An Overview of the CleverReports system
- Logging on and navigating the application
- Locating, running and sharing reports

- Utilizing dashboards reports
- Personalizing the user interface
- Creating new reports based on existing reports (Optional depending on audience, requires additional lesson)

Documents Utilized	Handouts include CleverReports User Guide
Location (s)	RTS provided centralized training facility

Clever Devices

6.5.9   CLEVERREPORTS ADMINISTRATOR TRAINING SYLLABUS

Audience	Those intending to run CleverReports and those responsible for user access to functions and content
Duration	6 hours
Prerequisites	Knowledge of transit operations and databases
General Objective	To enable students to be able to fully understand, operate and manage CleverReports
Overview	This is an instructor-led course covering the use and operation of CleverReports functionality. In addition, user management and report creation are covered. The course material is presented with a combination of slides and live software screen demonstration. Formal instruction includes hands-on, practical learning on the system software coupled with question and answer interaction throughout.

Topics	- Overview of CleverReports system - Logging in and navigating the application - Locating, running and sharing reports - Utilizing dashboard reports - Creating new reports based on existing reports - Effectively utilizing user, roles and groups in combination with content management - Configuration workshop where all users are actually added to the system, groups are created, and Content Management is defined
Documents Utilized	CleverReports User Guide
Location (s)	RTS provided centralized training facility

6.5.10   BUSTIME USER TRAINING SYLLABUS

Audience	Supervisors, system administrators, dispatchers and customer service
Duration	1-2 hours
Prerequisites	Knowledge of Microsoft Windows; familiarity with RTS operations
General Objective	To enable the trainer to train users to support and manage the systems underlying the BusTime implementation including all screens and reports
Overview	This instructor-led classroom training is designed for dispatchers/controllers, customer service and help desk personnel who are responsible for BusTime operations. The course covers a complete system overview and explanation of all BusTime functions used by the transit staff. It covers end-user functionality of the BusTime product for the transit employees to understand its role in their day-to-day work environment.

Topics

- BusTime overview
- BusTime system components and architecture
- BusTime website arrivals, map & subscriptions
- Supervisory website CAD/AVL like view

Documents Utilized	Handouts include BusTime User Guide
Location (s)	RTS provided centralized training facility or WebEx

Clever Devices

6.5.11   BUSTIME ADMINISTRATOR TRAINING SYLLABUS

Audience	Supervisors and system administrators
Duration	1-2 hours
Prerequisites	Basic to advanced knowledge of Microsoft Windows; familiarity with RTS operations
General Objective	To train users to support, manage, change and administer the systems underlying the BusTime implementation including all screens and reports
Overview	This is an instructor-led course. It covers end-user functionality of the BusTime admin console for the Real Time Passenger Information System administrator to understand system configuration and management in their day-to-day work environment. Hands-on skill training will be done with a workstation and actual software.

Topics

- BusTime Overview, System Components and Architecture
- BusTime website arrivals, maps and subscriptions
- Supervisory website CAD/AVL like view
- BusTime configuration parameters
- Using Service Bulletins to communicate with the riding public
- Managing passenger advisory signs
- Reports

Documents Utilized	Soft copies of the BusTime Admin Console User Guide
Location (s)	RTS provided centralized training facility or WebEx

6.5.12 CLEVERWORKS USER TRAINING SYLLABUS

Audience Personnel responsible for RTS scheduling and planning

Duration 4 hours

Prerequisites Knowledge of Microsoft Windows; knowledge of RTS schedule and operations

General Objective Users will learn how to navigate and utilize all the functions of the CleverWorks application

Overview Clever Devices will provide the transit authority with the ability to configure and manage their own database through CleverWorks database configuration training. These essential tools empower an agency to make changes to announcements, schedules, routes, stops, etc. The training will cover the topics below, which are essential to configuring a database for a new sign up and maintenance going forward.

Topics
- Data Import
- Data Integrity
- Stop Management
- Route Details Management
- Route Management
- Non-Revenue Route Management
- GeoFence Management
- Depot Management
- Traffic Signal Priority
- Audio Management
- Canned (Pre-defined) Data Management
- Configuration
- Data Export

Documents Utilized Handouts include CleverWorks System Guide accessed via the application

Location(s) RTS provided centralized training facility or WebEx

6.5.13   CLEVERWORKS SUPPORT TRAINING SYLLABUS

Audience   Personnel responsible for RTS scheduling and planning

Duration   8 hours

Prerequisites   Knowledge of Microsoft Windows; knowledge of RTS schedule and operations

General Objective   Users will learn how to manage and edit schedule data. This is accomplished by updating a current database and all steps involved in moving it to production.

Overview   Clever Devices understands the complexity of creating and maintaining a schedule database. Whether it's adding or moving a stop, or validating the data you have defined, let Clever Devices work with you to make sure your data is valid and complete for distributing it to vehicles.

Topics
- Initial discussion to determine training topics
- Data review
- Training as necessary

Documents Utilized   CleverWorks System Guide accessed via the application

Location (s)   RTS provided centralized training facility or WebEx

Clever Devices

6.5.14   APC RIDERSHIP REPORTING – RIDECHECK PLUS BASIC TRAINING

Audience	Managers, Trainers, Operations Analysts & Planners, and Schedulers
Duration	8 hours
Prerequisites	Basic to advanced knowledge of Microsoft Windows; familiarity with bus operation and RTS business rules
General Objective	The objective of this APC software training is to teach the RTS staff responsible for handling the APC data on how to become completely capable of using the basic Ridecheck Plus reporting system and to achieve a level of competence in understanding and operation of the APC analytic software package without outside support and to realize the full analytic value of the APC system.
Overview	This is an instructor-led course covering the basic use and operation of the Ridecheck Plus report system. Topics include setting up APC reporting software, managing data flow, optimizing APC parameters, data transfer and reporting module. The course material is presented with a combination of slides and live software screen demonstration. Formal instruction is followed by hands-on, practical learning on the system software coupled with question and answer interaction throughout the training session.

Topics

- Menus
- Graphic reports
- Tabular reports
- Setting up favorites
- Configuring report generation
- Drilling down into data
- APC data import
- APC database maintenance

- Bus stop data maintenance
- Analysis of the APC data
- Detection and correction of data anomalies using data management tools
- Troubleshooting procedures for the correlation processes
- Using data management tools
- Generation of National Transit Database and other APC reports
- Database editing procedures
- Ad hoc queries

Documents Utilized	Ridecheck Plus User Guide
Location (s)	RTS provided centralized training facility

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6.5.15   APC Ridership Reporting – Ridecheck Plus Advanced Training Syllabus

Audience	Managers, Technicians, Operations Analysts & Planners, End-User Trainer
Duration	8 hours
Prerequisites	Basic to advanced knowledge of Microsoft Windows; familiarity with bus operation and RTS business rules
General Objective	The objective of this APC software training is to teach the RTS staff the more advanced usage of Ridecheck Plus reporting system and to achieve a level of competence in understanding and operation of the APC analytic software package without outside support and to realize the full analytic value of the APC system.
Overview	This is an instructor-led course covering the advanced use and operation of Ridecheck Plus report system. Topics include advanced analysis of ridership, exporting results, setting up new users, importing CleverWorks, monitoring APC processing and troubleshooting issues. The course material is presented with a combination of slides and live software screen demonstration. Formal instruction is followed by hands-on, practical learning on the system software coupled with question and answer interaction throughout the training session.

Topics

- Import CleverWorks
- File Transfer Utility
- Ingestion
- Rollup
- Create Ridecheck forms for checkers
- Administration of users
- Global settings
- Import transit system information
- System Issues
- NTD reporting

Documents Utilized	Ridecheck Plus User Guide
Location (s)	RTS provided centralized training facility

Clever Devices

6.5.16   AVM USER TRAINING SYLLABUS

Audience	Supervisors, System Administrators, Maintenance
Duration	3 hours
Prerequisites	Basic knowledge of Microsoft Windows, vehicle maintenance knowledge
General Objective	To enable the student to access and use the AVM enterprise system
Overview	The AVM software product and its functionality are taught by instructors. These classes are hands-on, using real world scenarios that could happen in the shop to connect the class to the software in a meaningful way. The user will learn how to log into the software and utilize the four primary components of AVM: The Home Screen/Buses with Recent Critical Faults, Dashboards, Reports, and My Settings. Functional areas include login and basic navigation, running pre-defined reports, copying and editing reports, creating new filters and reports, exploring data, setting up e-mail broadcasts, and drilling down through dashboards.

Topics

- Overview of the AVM system
- Logging into the system, terminology and navigation
- Using AVM to rapidly identify the most important items to be addressed
- Finding, running and sharing the highest value AVM reports
- Using the dashboard to identify issues

Documents Utilized	AVM User Guide, AVM Instructor Manual, AVM Student Workbook
Location (s)	RTS provided centralized training facility for classroom session or individual garages for on-site sessions

6.6 TRAINING MATERIALS

Training materials will include presentations, instructor manuals, student workbooks, and application user guides/manuals. The documentation that is used in classes will be available to RTS as softcopies with permission to reproduce.

Clever Devices' Bus-In-a-Box (BIB) provides hands on training in the classroom and can also serve as a maintenance tool for testing equipment. The BIB units have equipment identical to the onboard solution deployed in the field. We will provide a BIB for fixed-route operations.

Dispatch and system administrative training can be conducted using this equipment, as well as maintenance training (performed with test bench BIB units). Each BIB will include the operator interface (an IVN controller and TCH), power supply, and other components selected after final design approval, to permit maintenance personnel to perform test and diagnostic operations for every Clever Devices solution installed on the fleet.

FIGURE 7: SAMPLE BUS-IN-A-BOX

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Clever Devices

7   SYSTEM WARRANTY

Clever Devices prides itself on providing the best service and support in the industry. Over the past 30 years, we have been committed to partnering with our clients to provide high quality transportation to the riding public. As part of this goal and mission, our commercial off-the-shelf (COTS) products are highly reliable, which minimizes warranty costs and results in a low total cost of ownership. In the event that one of our products needs service, Clever Devices responds quickly to provide a comprehensive resolution to the issue. The person answering your call, is the same person that can work with you to resolve your issue. Many of our technical support specialists have extensive field experience, meaning that they approach product issues and customer concerns with a real-world perspective and with specific transit experience. This allows our clients to confidently, and consistently, deliver improved service to their ridership and derive maximum return on their investment in new technology.

To support the proposed warranty, maintenance and support services, Clever Devices will provide service employees, agents, and subcontractors that have the necessary skills, training, and background to competently and professionally provide support for the Clever Devices ITS systems. Clever Devices offers reliable support to our customers in order to maintain each system to its fullest functionality and specified performance requirements. As the proposed solution will be hosted by Clever Devices, we will be responsible for all maintenance of the server hardware and software.

Clever Devices is committed to providing excellent customer service and prides itself on working with our clients to develop efficient and effective service processes that meets their needs. We are confident that by choosing Clever Devices you will minimize your inherent risk, not only because we have a superior service department, we also have extensive experience working with multiple transit agencies throughout North America.

During the warranty and maintenance periods, the single point of contact for all warranty administration will be Robert Manaseri, Vice President of Service and OEM, who can be reached via phone, email, or mail:

- Telephone: (516) 433-6100
- E-mail: RManaseri@CleverDevices.com
- 300 Crossways Park Drive, Woodbury, NY 11797

Clever Devices will provide hardware and software warranty and support services on all deployed components covered under this agreement. The warranty period commences at Final System Acceptance. Additionally, RTS shall have the option of purchasing additional years of warranty, following the expiration of the initial warranty period.

Table 8 provides an overview of Clever Devices' proposed warranty, maintenance and support services through system acceptance as well as the years following system acceptance.

TABLE 8: BASE CLEVER DEVICES' SERVICES

SUPPORT CATEGORY	DESCRIPTION
Technical Support & Call Center	• Available as long as a warranty or service agreement is in place • Available 24 hours a day, 7 days a week, 365 days per year, the Technical Support & Call Center will act as the escalation point for all service requests generated by RTS
Hardware Warranty	• Applies to onboard equipment provided by Clever Devices • Repair or replacement of returned hardware
Software Warranty	• Applies to onboard and fixed-end software provided by Clever Devices • Software warranty includes updates for bug fixes and patches

The following table identifies the response provided under the proposed warranty, maintenance, and support services.

TABLE 9: SERVICE RESPONSE TIME

PRIORITY CATEGORY	RESPONSE TIME	DEFINITION
Critical Issues	2 hours from notification	• Critical issues resulting in central system functional systemic failures of vehicle tracking, communications, and traveler information support functions • Service requests into Clever Devices' Technical Support department • Provided by the Technical Support & Call Center • Establish VPN access, if required
Non-Critical Issues	Next Business Day	• For on-board vehicle components where major functionality is not impacted • A workaround is required and available to resume system functionality • Establish VPN access, if required • Provided by the Technical Support & Call Center

Clever Devices

7.1   TECHNICAL SUPPORT AND CALL CENTER

Clever Devices' Technical Support department provides a centralized point of contact for all issues reported and its services are included as part of the hardware warranty and software warranty solution. The Technical Support & Call Center is available by phone 24 hours a day, 7 days a week, and 365 days a year and will provide remote support beginning the date the system is installed. Clever Devices' Technical Support department will act as the escalation point for all service requests.

Backed by Clever Devices' software, deployment, and applications engineers, the Technical Support team provides customers with prompt service and incident resolution. The Technical Support department is located at Clever Devices' main office in Woodbury, NY.

Requests for service will be generated by RTS personnel contacting Clever Devices' Technical Support personnel. RTS will be able to report incidents and request service support to Clever Devices' Technical Support department via phone or email:

- Toll-free Technical Support Service: 1-888-478-3359
- E-mail: TechnicalSupport@CleverDevices.com

Regular business hours are Monday through Friday, 8:30am to 5:30pm Eastern Time, with extended hours offered as per customer requirements. All other times are considered "after-hours."   All after-hour calls should be made solely to the Tech Support phone at 1-888-478-3359. After-hour calls will be forwarded to an answering service and then to a Clever Devices on-call support representative.

Upon discovery of an error, and if requested by Clever Devices, the customer agrees to submit a listing of any data, which may include data log files, so that Clever Devices may reproduce the error and the operating conditions under which the error occurred or was discovered.

In order to support the system, Clever Devices requires remote access to the servers via a Virtual Private Network (VPN) connection. Clever Devices will not access the RTS internal network for any purpose other than for technical online support.

Clever Devices' Technical Support & Call Center includes:

- Respond to requests from RTS for support for the diagnosis and restoration of failed central subsystems and onboard systems
- Assign a priority level to each issue
- Create and assign an Incident Tracking Number and provide to RTS
- Document issue specific information and provide diagnostic troubleshooting processes through issue resolution
- Remotely access and troubleshoot issue via Virtual Private Network, as required
- If escalation required, coordinate technical resolutions with other Clever Devices' subject matter experts
- Document and communicate issue status with key RTS personnel and Clever Devices' stakeholders throughout issue life cycle
- Track, escalate, and resolve the incident ticket

7.2 HARDWARE WARRANTY

Clever Devices will repair or replace any faulty Clever Devices' hardware components returned to Clever Devices. Clever Devices' repair facility, located in Woodbury, NY, provides full repair services for hardware products. The repair facility will perform test and repair service on faulty equipment down to the board component level utilizing state-of-the-art test equipment.

All repaired equipment will be certified, tested, and updated with the latest firmware prior to return to the spare parts pool.

Clever Devices Hardware Repair Service includes:

- Receive malfunctioning equipment into repair service facility
- Bench technicians analyze, troubleshoot, and repair or replace with new equipment
- Configure equipment to current operating parameters
- Bench technician performs system level test on the repaired or replaced equipment
- Document repair activities including owner of failure and components used to perform repair
- Return repaired equipment to replenish the spare parts pool

Clever Devices recommends that RTS purchase a 5% quantity of spare parts to minimize downtime during the remove/replace service process.

7.2.1 WARRANTY CLAIMS

Clever Devices offers quality maintenance training courses, taught by experienced professionals, that can clearly, concisely, and thoroughly teach RTS personnel the appropriate remove and replace procedures and techniques. Therefore, Clever Devices recommends that an RTS technician, trained by Clever Devices, will replace defective components utilizing a pool of RTS-owned spare parts. If the removal of the faulty component and replacement with a spare component does not resolve the issue, RTS will call Clever Devices' Technical Support for remote assistance.

7.2.2 RETURN MERCHANDISE AUTHORIZATION (RMA) PROCESS

RTS is responsible for removing faulty onboard equipment and returning to Clever Devices via a Return Merchandise Process (RMA). No products will be accepted without a Return Merchandise Authorization (RMA) number. Clever Devices will respond to an RMA number request within two (2) business days. RMA numbers can be obtained from Clever Devices' Customer Service Department:

Customer Service number: 1-888-478-3359

Email address: CSReturns@CleverDevices.com

In order to process a request, Clever Devices will need the following information:

- Item Description
- Clever Devices Part Number
- Serial Number
- Quantity being returned
- Reason for Return
- Bus Number, if applicable

Once Clever Devices provides an RMA number, RTS can then send the product to Clever Devices. The original purchaser must package the product properly. Clever Devices is not responsible for any damage to

the product caused during transit or for any package lost by the shipping company. RTS shall assume the costs of all defective product shipments made to Clever Devices.

RMA Ship to Address:
        Clever Devices
        300 Crossways Park Drive
        Woodbury, NY 11797
        Attn: Customer Service Department
        RMA Returns: RMA#

Once Clever Devices receives the product, it will subsequently be evaluated by a Clever Devices' Bench Technician. If the product is repairable, Clever Devices' personnel will repair the product. If the product is not repairable, Clever Devices will replace the product with another part, purchased by RTS. The "Owner of Failure" will be assessed at the time of the evaluation and shall be reported by the Clever Devices Customer Service Representative at time of completion. Clever Devices will make best efforts to return the product within 30 days of receiving it from RTS.

Upon a completed Failure Analysis, product(s) will be ready to ship back to RTS. The shipping costs to RTS of all products covered under warranty will be the responsibility of Clever Devices.

For instances where RTS returns parts to Clever Devices that are determined after failure analysis to be "No Problem Found," RTS will be charged a standard Clever Devices bench fee. The shipping costs for all Non-Warranty Repairs/Replacements and/or No Problem Found conditions will be the responsibility of RTS. Any material, part, or component used for replacement under the initial warranty will assume the remaining term of warranty of the part repaired or replaced.

Customers can contact Clever Devices at any time during the RMA return process to check the status of the equipment. Clever Devices will provide RTS with a detailed quotation and/or invoice for all costs associated with non-warranty repairs. Replaced components shall assume the original warranty terms.

7.3 SOFTWARE WARRANTY

In order to ensure that our software, which are designed to be free from defects, continue to function properly and be in conformance with the technical requirements. RTS will acquire permanent title to all the system's hardware and non-proprietary software provided under the contract, free and clear of all liens and encumbrances. For all software-related issues reported by RTS, Clever Devices' Technical Support personnel will assign each reported incident an Incident Tracking Number. The Technical Support department will be responsible for tracking, escalating, and resolving the incident ticket.

A reported issue is entered and tracked via Clever Devices' internal issue-tracking system. This process facilitates the management and storage of defects, features and improvements throughout the software development process and allows complete lifecycle management of an issue from creation through closure.

During the warranty period, Clever Devices will furnish at no cost any materials, equipment, software, documentation detailing the operation and maintenance of the software necessary to maintain the system in accordance with the warranty. Clever Devices will provide all updates and upgrades during the maintenance period, and the labor to deploy the update or upgrade, if required to resolve a bug. Clever Devices can quote the cost to deploy all other updates or upgrades, including those to introduce features or enhancements which are above the original published and agreed specification, or product manual.

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