RPMA 101 Module 5: Network Operations

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Module 5 - Outline

- On-Ramp Network Operational Roles
- On-Ramp Network Daily Monitoring Operations
- On-Ramp Network Expansion Operations
- On-Ramp Network Component Upgrades
- On-Ramp Network Periodic Maintenance and Tuning
- On-Ramp Network Troubleshooting

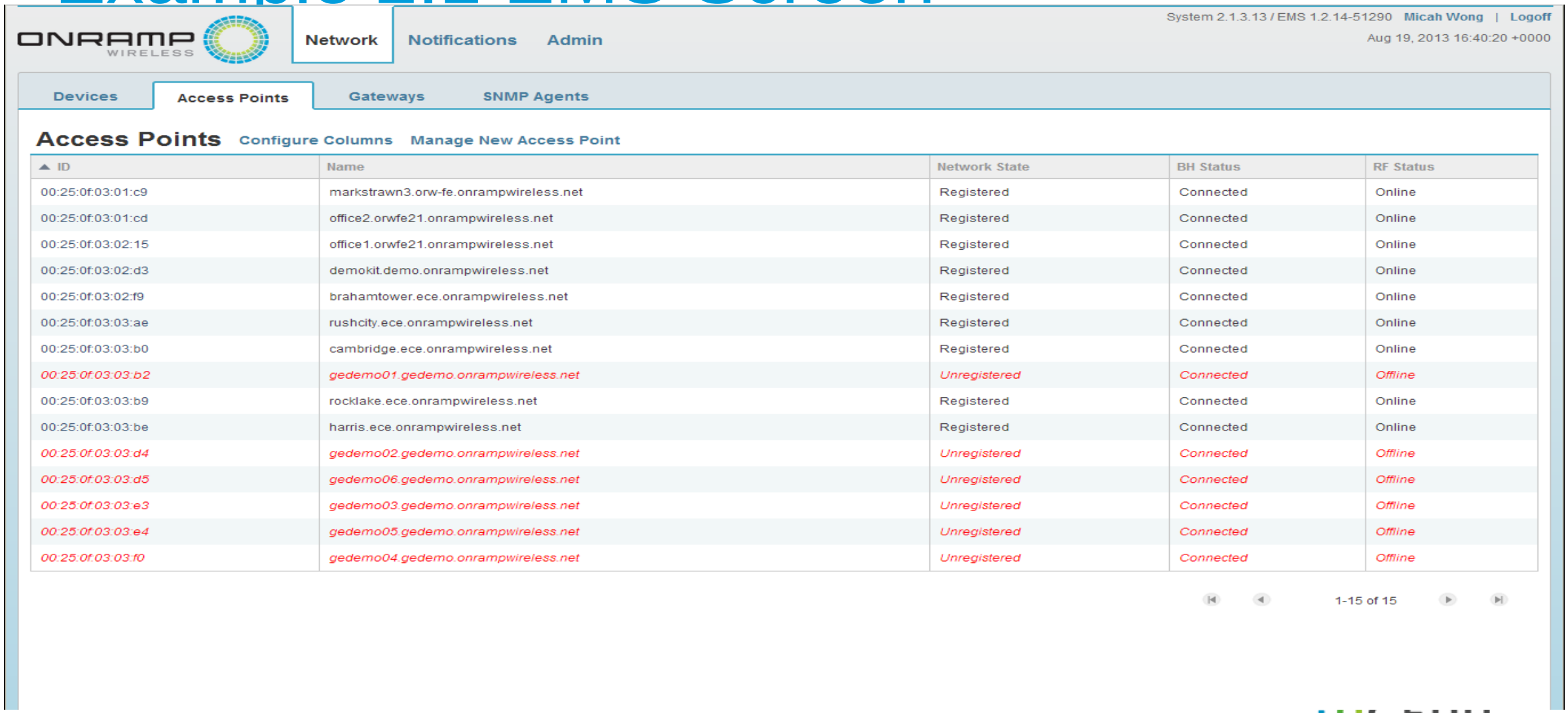
Network Operational Roles Summary

- **Network Operator**
  - Performs daily monitoring and management of communication systems
  - Support network expansions projects
  - Subscribes to EMS Alarms and escalates problems to specialist as needed
- **Network Specialist**
  - Plans and executes expansion of communication systems
  - Triages network alarms as escalated by the network operator
  - Monitors the health of the On-Ramp Network and backhauls
- **Applications Operator**
  - Performs daily monitoring and management of application data
  - Subscribes to OTV Alarms
  - Escalates problems to specialist as needed
- **Applications Specialist**
  - Subscribes to OTV Alarms
  - Triages application alarms as escalated by the applications operator
- **Back office IT Administrator**
  - Daily monitoring of IT systems
  - Sets up log archival mechanisms

Network Typical Daily Operations

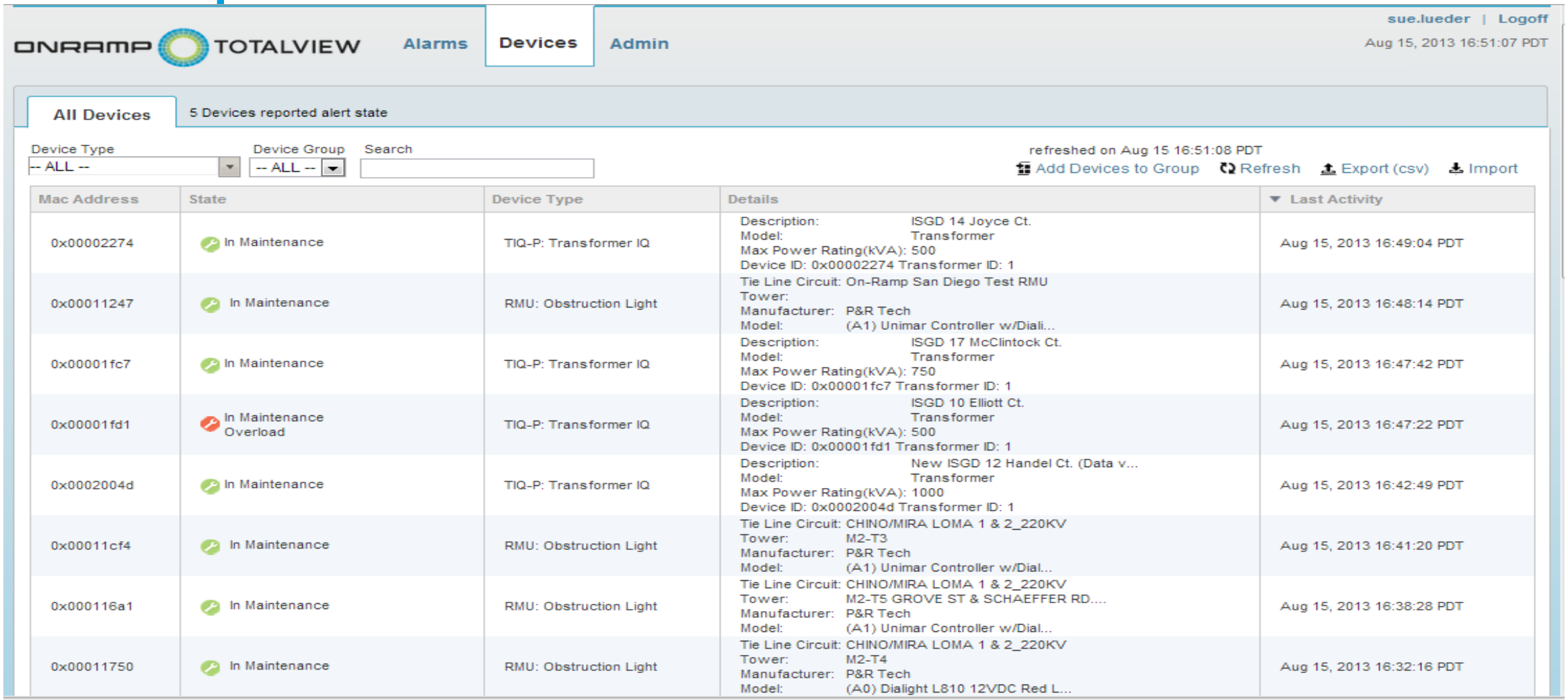
- Network Operator
  - Scan network events and activity on the system through the EMS screen
  - Setup event notifications in EMS
  - Escalate any new notifications requiring intervention to Network Specialists
- Applications Operator
  - Scan application/endpoint events and activity on the system through the OTV screen
  - Setup event notifications in OTV
  - Monitor email and alarm screens for any new or persistent alarms
  - Manage application meta data in OTV
  - Escalate any new alarms requiring intervention to Applications Specialists

Example 2.1 EMS Screen



ID	Name	Network State	BH Status	RF Status
00:25:0f:03:01:c9	markstrawn3.orw-fe.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:01:cd	office2.orwfe21.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:02:15	office1.orwfe21.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:02:d3	demokit.demo.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:02:f9	brahamtower.ece.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:03:ae	rushcity.ece.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:03:b0	cambridge.ece.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:03:b2	*gedemo01.gedemo.onrampwireless.net*	*Unregistered*	*Connected*	*Offline*
00:25:0f:03:03:b9	rocklake.ece.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:03:be	harris.ece.onrampwireless.net	Registered	Connected	Online
00:25:0f:03:03:d4	*gedemo02.gedemo.onrampwireless.net*	*Unregistered*	*Connected*	*Offline*
00:25:0f:03:03:d5	*gedemo06.gedemo.onrampwireless.net*	*Unregistered*	*Connected*	*Offline*
00:25:0f:03:03:e3	*gedemo03.gedemo.onrampwireless.net*	*Unregistered*	*Connected*	*Offline*
00:25:0f:03:03:e4	*gedemo05.gedemo.onrampwireless.net*	*Unregistered*	*Connected*	*Offline*
00:25:0f:03:03:f0	*gedemo04.gedemo.onrampwireless.net*	*Unregistered*	*Connected*	*Offline*

Example OTV Screen



Mac Address	State	Device Type	Details	Last Activity
0x00002274	In Maintenance	TIQ-P: Transformer IQ	Description: ISGD 14 Joyce Ct. Model: Transformer Max Power Rating(kVA): 500 Device ID: 0x00002274 Transformer ID: 1	Aug 15, 2013 16:49:04 PDT
0x00011247	In Maintenance	RMU: Obstruction Light	Tie Line Circuit: On-Ramp San Diego Test RMU Tower: Manufacturer: P&R Tech Model: (A1) Unimar Controller w/Diali...	Aug 15, 2013 16:48:14 PDT
0x00001fc7	In Maintenance	TIQ-P: Transformer IQ	Description: ISGD 17 McClintock Ct. Model: Transformer Max Power Rating(kVA): 750 Device ID: 0x00001fc7 Transformer ID: 1	Aug 15, 2013 16:47:42 PDT
0x00001fd1	In Maintenance Overload	TIQ-P: Transformer IQ	Description: ISGD 10 Elliott Ct. Model: Transformer Max Power Rating(kVA): 500 Device ID: 0x00001fd1 Transformer ID: 1	Aug 15, 2013 16:47:22 PDT
0x0002004d	In Maintenance	TIQ-P: Transformer IQ	Description: New ISGD 12 Handel Ct. (Data v... Model: Transformer Max Power Rating(kVA): 1000 Device ID: 0x0002004d Transformer ID: 1	Aug 15, 2013 16:42:49 PDT
0x00011cf4	In Maintenance	RMU: Obstruction Light	Tie Line Circuit: CHINO/MIRA LOMA 1 & 2_220KV Tower: M2-T3 Manufacturer: P&R Tech Model: (A1) Unimar Controller w/Dial...	Aug 15, 2013 16:41:20 PDT
0x000116a1	In Maintenance	RMU: Obstruction Light	Tie Line Circuit: CHINO/MIRA LOMA 1 & 2_220KV Tower: M2-T5 GROVE ST & SCHAEFFER RD.... Manufacturer: P&R Tech Model: (A1) Unimar Controller w/Dial...	Aug 15, 2013 16:38:28 PDT
0x00011750	In Maintenance	RMU: Obstruction Light	Tie Line Circuit: CHINO/MIRA LOMA 1 & 2_220KV Tower: M2-T4 Manufacturer: P&R Tech Model: (A0) Dialight L810 12VDC Red L...	Aug 15, 2013 16:32:16 PDT

On-Ramp Network Expansion Activities

- New Base Station Deployments
  - New coverage maps requested from On-Ramp
  - Channel list upgrades could be required
  - Forced network scans could be required
- Endpoint Batch Deliveries and Deployments
  - New key files and endpoint node lists imported into the back office
  - Endpoint Meta data management at OTV and EMS
- New Application Types
  - Network Specialist responsible for new network plans
  - On-Ramp will assist IT Administrator in installation of new data adapters at OTV

Network Component Upgrades

- On-Ramp components will occasionally require firmware upgrades for new features and bug fixes
- Any component upgrade is carefully planned and scheduled
- Network Specialist actively manages this process to reduce downtime duration
- Access point firmware can be upgraded over the backhaul using SSH
- Appliance software components can be upgraded with a minimum system downtime
- Endpoint firmware can be upgraded over the air
- EMS supports staging of endpoint firmware upgrades in a lab environment or in small groups prior to network-wide rollout

Network Tuning and Periodic Maintenance

- Network Specialist monitors the network health and performance and may occasionally optimize the On-Ramp communications network
  - Note: Currently, this is largely performed by On-Ramp personnel. Partner teams are trained as they gain experience.
- IT Administration may prepare periodic back office maintenance reports
- Base Station annual maintenance may require site visits to manually inspect the site for any issues

Network Notifications

- EMS acts as a SNMP management system for network notifications
- EMS provides visibility into network notifications for Application Operators and Specialists
- EMS provides the ability to email network notifications to subscribed users
- Examples of EMS network notifications
  - Gateway is down
  - AP RF is down
  - Node join failures
- OpsView provides email notifications for web application and hardware monitoring
  - Web applications are not accessible
  - Third party interfaces (e.g. DNP3 or REST) are not accessible
  - High memory usage
  - Full hard disk
  - High network bandwidth usage

Application Alarms

- OTV provides visibility into application alarms for Application Operators and Specialists
- Each application may have a set of unique alarms defined with a predefined alarm severity (from Critical to Informational)
- Operators and Specialists may subscribe to email for any single or group of alarms
- Operators may acknowledge an alarm and add notes to the system to help track the status of an alarm
- Alarms are automatically cleared by the endpoint when the alarm condition has disappeared
- For example: a permanent line fault detected by a WSO-11 will be cleared when the line is restored. The timestamps of the fault and the clear event are provided

- Reference:
  010-0106-00 OTV Operator Guide and application supplements

Network Troubleshooting

- On-Ramp access point(s) backhaul outages
  - What type of backhaul is the access point using?
  - Can you ping or log into the access point?
  - Why can’t the access point connect to the gateway?
  - What happens if it not accessible?
- On-Ramp OTV, EMS, or third party interface service is not available
  - Is the service running?
  - Are log files being generated?
  - Is the service up locally?
  - Which checks are returning notifications? Internal or External?

Module 5 Review Quiz

- Who is responsible for On-Ramp network tuning?
- What is the difference between alarm clearing and alarm acknowledgement?
- What are some examples of network expansion?
- Why might you want to stage an endpoint upgrade activity in a lab?

Document Reference Summary

- 010-0045-00 EMS Operator Guide (1.4)
- 010-0107-00 EMS Operator Guide (2.1)
- 010-TBD-00 Appliance Troubleshooting Guide (1.4)
- 010-TBD-00 Appliance Troubleshooting Guide (2.1)
- 010-0106-00 OTV Operator Guide
  - 010-0104-00 OTV Supplement GE WiYZ Remote
  - 010-0100-00 OTV Supplement Electric AMI
  - 010-0099-00 OTV Supplement Gridsense TIQ
  - 010-0098-00 OTV Supplement SEL Overhead FCI
  - 010-0097-00 OTV Supplement Obstruction Lighting
  - 010-0096-00 OTV Supplement Gas Pressure Sensor
  - 010-0038-00 OTV REST API Guide