

Surface Movement Guidance Control Systems (SMGCS)

System Application

Surface Movement Guidance Control System (SMGCS) capabilities can be added as a modular option to the *Freedom Series™* Airfield Lighting Control and Monitoring Systems (ALCMS). Refer to Descriptive Bulletin LAS-DB-003 for ALCMS information. Using powerline carrier technology, SMGCS functionality can be added with minimal disruption to airport operations. Typical applications include the following:

- Control and monitoring of individual lamps on the airfield including adjacent lamp failure monitoring in compliance with CAT II/III requirements.
- Location identification and alarming of each failed lamp to maintenance and operations personnel on ALCMS graphics screens.
- Control and monitoring of in-pavement and elevated stopbar lights and taxiway centerline lead-on lights. Sequence controlled from the control tower per CAT II/III requirements.
- Synchronized flashing control and monitoring of in-pavement and elevated runway guard lights.
- Control and monitoring of individual taxiway segments for automated SMGCS routing or guidance of aircraft into a Central De-icing facility or to the terminal building gates.
- Can be used anywhere circuit selector switches would traditionally be used: directional centerlines, touchdown zones, approach and PAPI systems. Added benefits of reduced cabling, configurable segment control and individual lamp failure monitoring.
- Control of ALSF/SSALR dual mode operation, REILs, ODALS, displaced thresholds, traffic signals or temporary construction lighting without additional field cabling.
- Control and monitoring of conventional and infrared lighting for overt / covert operations.
- Monitoring of approach steady burning and sequenced flashing strobe lighting systems.
- Monitoring of sensors for aircraft or incursion detection and airport perimeter security.
- Integral part of a complete Runway Status Light System (RWSL).



Fig. 1 Congestion at Airports and potential runway incursions can be reduced with the Freedom Series SMGCS system.

Standards Compliance

- FAA Advisory Circular 150/5345-56, Spec L-890 L890-X-Y Classification types where:
 - X = D - SMGCS (Individual Lamps Out)
 - Y = A - Preset Failsafe
 - B - Last State - Latching Failsafe
- FAA Advisory Circular 150/5340-30, Design and Installation Details for Airport Visual Aids.
- FAA Advisory Circular 120-57A, Surface Movement Guidance and Control System.
- ICAO Annex 14, Volume 1, Aerodrome Design and Operations.
- ICAO Aerodrome Design Manual Doc 9157, Part 5.
- ICAO SMGCS Manual Doc 9476-AN/927.
- Transport Canada Aerodrome Standards and Recommended Practices, Volume 1, TP-312E.

Powerline Carrier Technology

To control or monitor an individual lamp on the airfield, an addressable switch is installed between the isolation transformer and the fixture. Communication signals are superimposed on the series circuit current, eliminating the need for separate control wires. Features include:

- Communication on existing shielded or non-shielded series circuit field cables, with no additional wiring, cables or fiber to install.
- Can be installed on existing SCR, Saturable Reactor or Ferro-resonant type regulators.
- Can be installed on selected lamps in a circuit. Addressable switches are required only on the lamps to be controlled or monitored.
- Soft start feature ensures lamps do not dim or CCR does not trip when switching segments.
- Does not use repeaters or repeating technology, eliminating single points of failure.
- Fast multi-segment control in less than one second. Individual lamp monitoring in less than two seconds.
- Programmable failsafe operation to ensure lights remain in their last state or in a pre-programmed safe state (e.g. red stopbar lights on) in the event of control system or communication failure.
- Operational changes are easily accommodated in software without re-wiring the field circuits.
- Automatic tuning and calibration procedure optimizes communication signal response.



Fig. 2 Safegate Lamp Monitor and Switch (LMS) allows control and monitoring of every lamp on the airfield. The LMS simply plugs in between the isolation transformer and lamp.

Controlled Stopbars

- Proceed and reset buttons on the ATCT graphics screen control the stopbar sequence. Sensor override buttons allows ATCT to override the sequence to clear emergency vehicle traffic.
- Microwave or induction loop sensors detect an aircraft's presence. Signals are transmitted over the powerline using sensor interface units.
- Monitoring of individual lamps in the stopbar and lead-on sections. Alarming on 3 lamp failures, two adjacent lamp failures or one elevated stopbar failure.

Runway Guard Lights (RGL)

- Accurately synchronizes the flashing per specifications without any vault or field located master units, controllers, or wired devices.
- Meets synchronization requirements for elevated and in-pavement RGLs without any communication hardware connected.
- Programmable timing sequences allows RGL bars to be offset from each other to minimize load fluctuations on the CCR.
- Zero off-state leakage current ensures maximum visual contrast between the on and off state.
- Monitoring of individual lamps including alarming of three lamp failures, two adjacent failures or one elevated RGL failure.



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