



HF/VHF/UHF Go-Box and Antenna System for Transportable Amateur Radio Operation



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[http://www.qsl.net/lmtdcs/2015-02-07_Go-Box & antennas.pdf](http://www.qsl.net/lmtdcs/2015-02-07_Go-Box_&_antennas.pdf)



Briefing Topics

- **Objective and requirements**
- **Final photos, front and rear views**
- **Key operational details**
- **Go-box in field deployment**
- **Portable antenna system**
- **Construction components**
 - Mechanical structure
 - Key electronics
 - Supporting electronics
 - Antennas
- **Lessons learned**
- **Future enhancements**



Objective

Design, acquire essential components, and assemble a transportable amateur radio station

- Capable of operating on most bands and modes used by ham radio emergency communicators**
- Compact; easy to transport, deploy and operate; using either commercial or backup power sources**



Requirements

- **Bands:**
 - HF: 10m thru 40m SSB, CW and digital data
 - VHF/UHF: FM and digital data: 6m, 2m, 220, 440
- **Power:** Fully operable with AC (commercial power or portable generator) or DC (large capacity 12V battery)
- **Layout:** Compact as possible with logical and “operator friendly” arrangement of components
- **Weight/size/shape:** Can be loaded onto transport vehicle by one person, if necessary
- **Mobility:** Relatively easy to maneuver and relocate on-site
- **Antennas:** Good performance, robust, easy to erect, without need for guy wires
- **Speed of Deployment:** Easy, fast setup/breakdown, rapid operational status once on-site



Ham radio HF/VHF/UHF go-box for transportable operation (front) (Emergency/disaster communications, Field Day, etc.)



8U rolling 19" rack

AC power distribution unit
with pull-out lamps

ADI VHF/UHF transceivers; left
to right: 2m, 220, 440

Left: MFJ switching P.S.
Middle: HF transceiver speaker
Right: Power/SWR meter for 2m
and 440 (via duplexer)

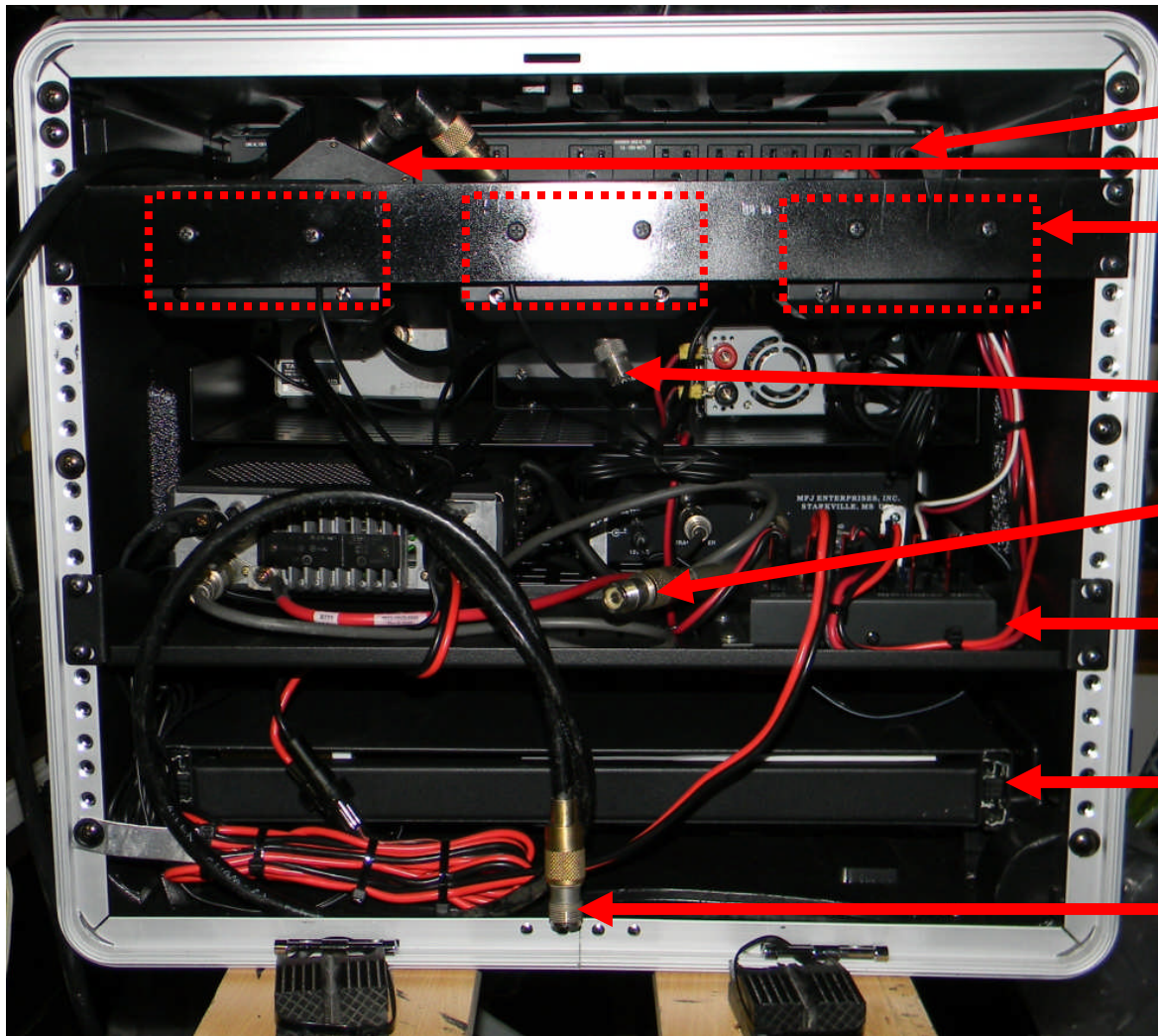
Left: MFJ antenna tuner
Right: Alinco HF transceiver

Signalink sound card

1U lockable drawer for
manuals, microphones
during transit and small
components



Ham radio HF/VHF/UHF go-box for transportable operation (rear) (Emergency/disaster communications, Field Day, etc.)

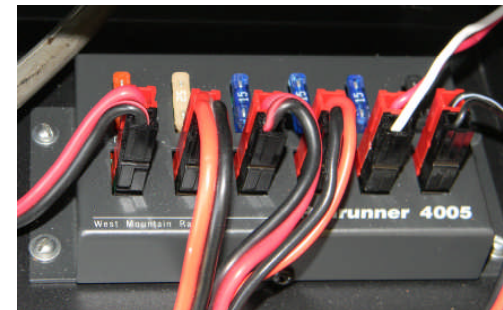


- 8U rolling 19" rack
- AC power distribution unit
- Duplexer for 2m and 440
- Three forward-facing individual speakers behind 1U panel for 2m, 220 and 440 transceivers
- SO-239 to 220 antenna
- PL-259 w/barrel adaptor to HF antenna
- RIGrunner DC power distribution unit
- Rear of 1U lockable drawer for manuals and small parts
- PL-259 w/barrel adaptor to 2m/440 dual band antenna



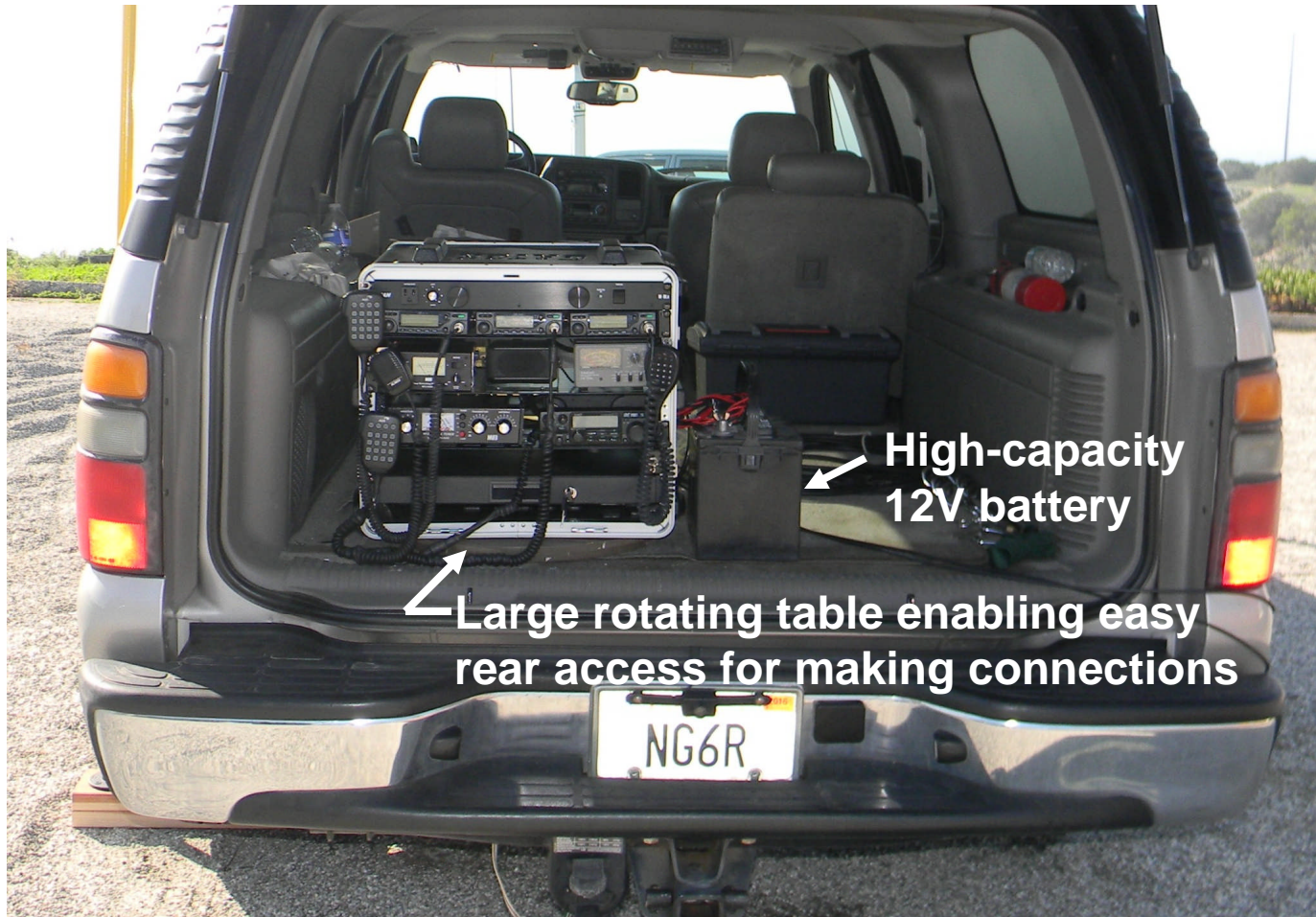
Key operational details

- Thin Alinco DX-70 HF front-end unit can be easily detached and operated 4' from Go-box if convenient
- “Tuning” switch added to front right edge of Go-box to quickly tune HF rig at 10W before operating at 100W; CW keyer 1/8” jack also added to this plate
- Fuses selected to match equipment needs: 40A input, 25A HF rig, 15A for three V/UHF transceivers, 1A for display lamps in antenna tuner





Go-Box in transport vehicle





Views of deployed antenna masts



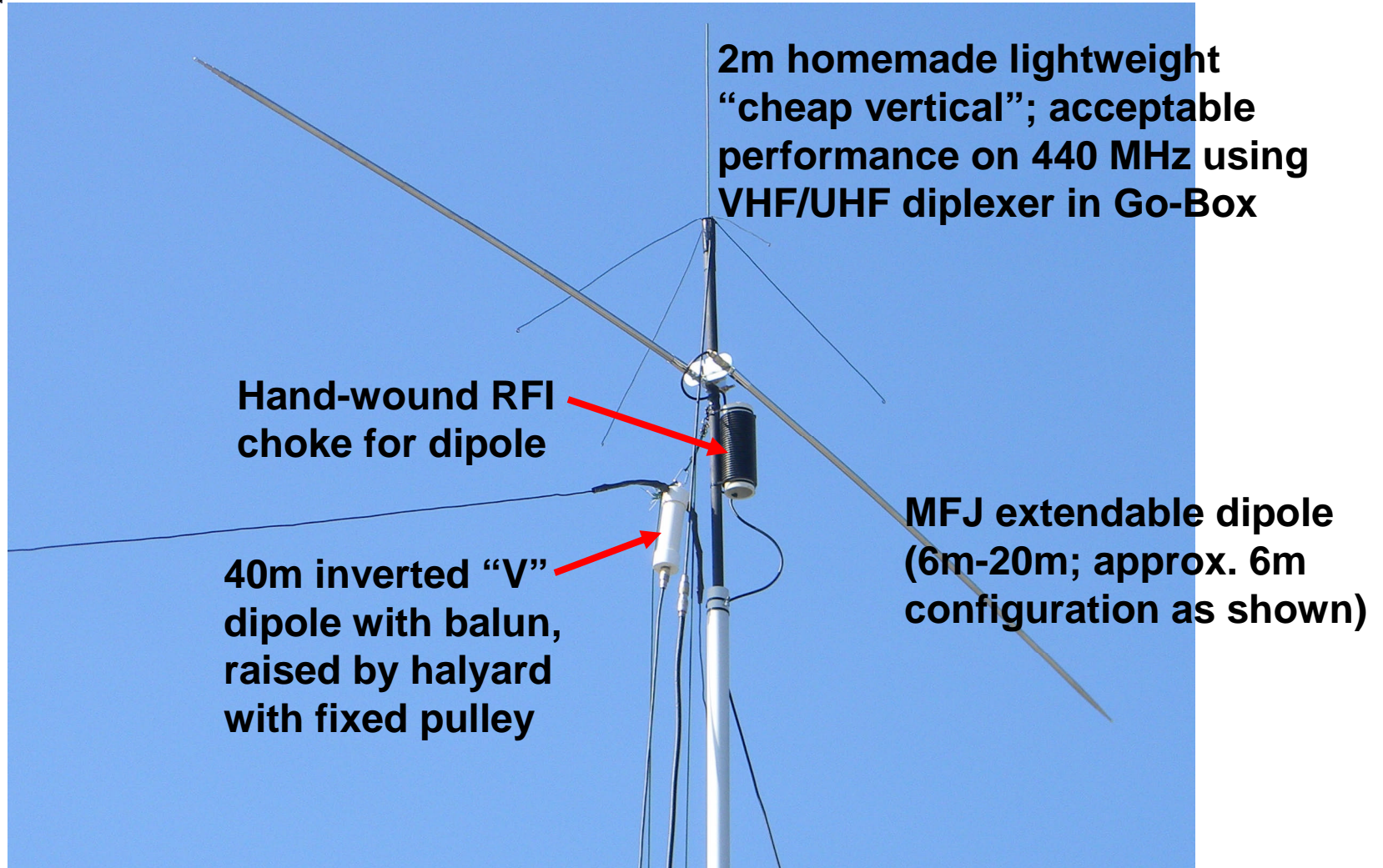
5-section, 20' heavy-duty aluminum flagpole from Harbor Freight with 4' wooden pole attached to top section



3-section, 23' extension pole from Lowe's (right in photo), only partially extended here



Primary antenna array



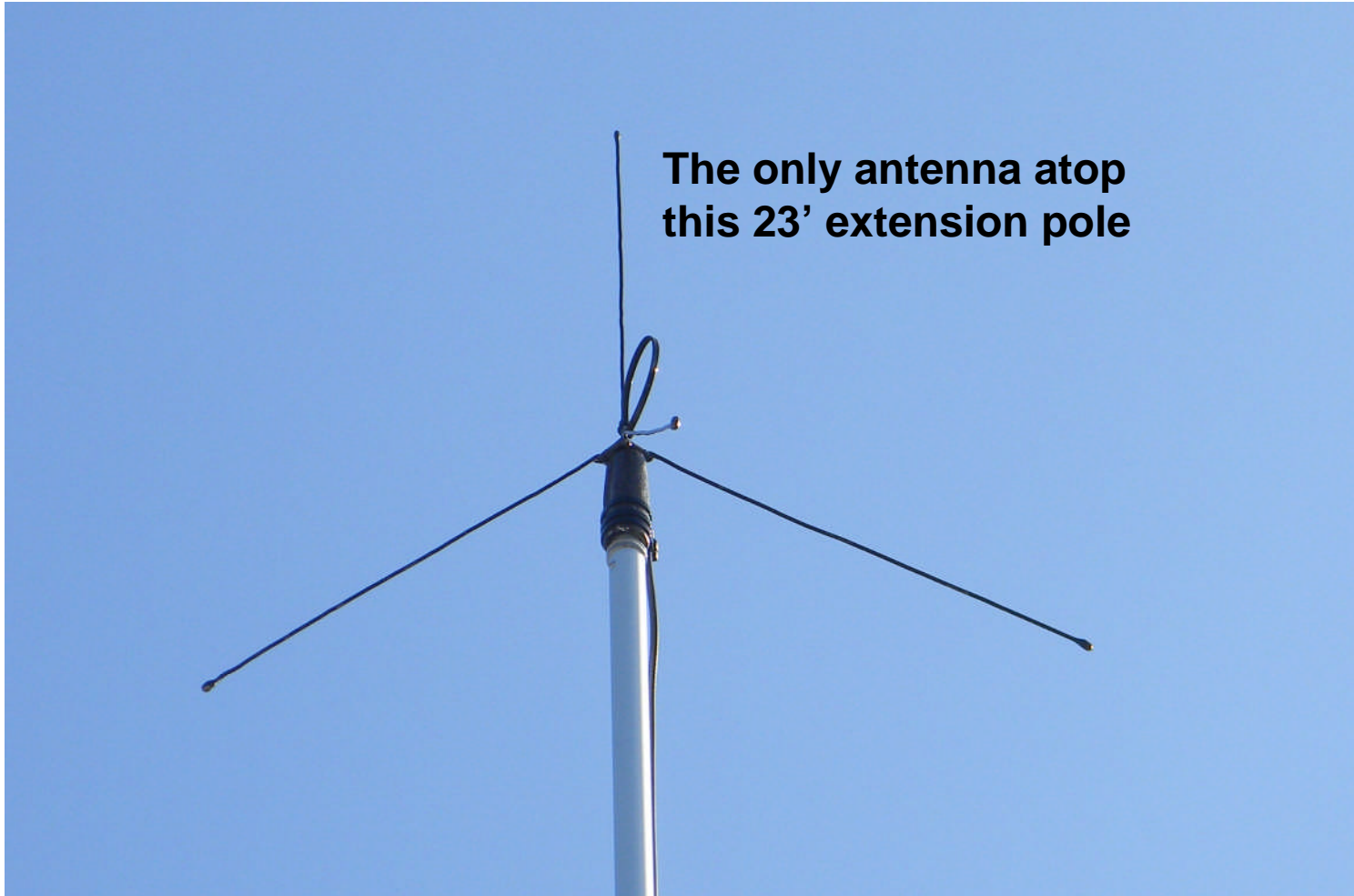


MFJ dipole with elements extended for 20m operation





220 MHz homemade "cheap vertical"



The only antenna atop
this 23' extension pole



Mast support concepts



Hitch mounted flagpole holder from Amazon.com; ancillary front trailer hitch had previously been installed on vehicle



2" x 6" wooden under-tire support with pipe flange



Structural elements

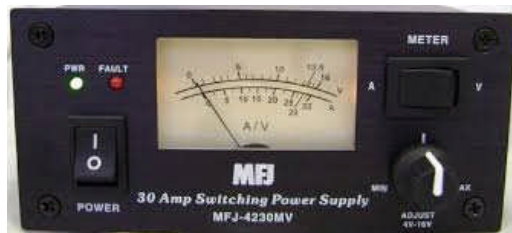


x 3





Key electronic components





Supporting electronics



x 4

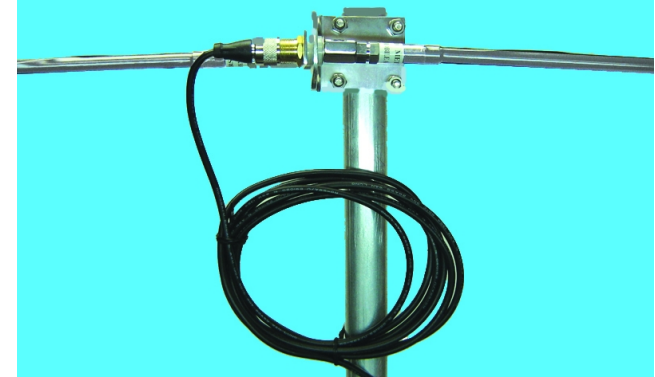


Fuses: IN: 40A;
OUT: 1@25A, 3@15A, 1@1A





Antenna components





Lessons learned

- **Modular construction straightforward—no real assembly surprises; innovation needed for securing some components to shelves (e.g., makeshift brackets)**
- **Layout design focused on both ease of operation and conserving vertical space, i.e., 1U components on common shelf, 2U components on common shelves**
- **Use of Go-Box cabinet with rear rails is a must—secure some components out of sight and better utilize available volume**
- **8U design OK, but could eliminate AC distribution unit and lockable drawer to create lighter 6U design; more weight could be saved by eliminating four external speakers and relying on internal speakers**
- **Lifting large size possible but awkward for one person; suggest use of light-duty stowable ramp to roll onto and off of transport vehicle**
- **To minimize cost, acquire used components over an extended period; if purchased new, total cost of Go-Box (less antennas and external power sources) approximately \$2,500 (Some of the components used here are not currently available new, such as the Alinco DX-70. However, new equivalent units are available, although costly.)**



Future enhancements

- **Stowable ramp to load and offload rolling Go-Box**
- **Detachable table at tailgate with folding chairs to enable convenient operation by one or multiple operators**
- **Use of microphone extension cables on all transceivers to enable convenient operation from table during extended ops**
- **Pop-up tent overlapping tailgate for protection from sun and inclement weather**

