

RIDAM Units placed alongside taxiways and runways would monitor aircraft moving on the ground, display short alphanumeric messages and go/stop commands from the control tower, and automatically issue warnings to pilots of aircraft moving in violation of runway clearances.

equipment could utilize solar power with battery backup. Alternatively or in addition, at night, power for operation and battery charging could be drawn from the power connection for pre-existing blue night taxiway lights. The system could

readily be enhanced through addition of lights, signs, and other equipment at various taxiway and runway locations; this portability and enhanceability could be of great value during emergencies and airport modifications.

The illuminated sign could display stop/go signals or other short alphanumeric text messages to pilots of aircraft awaiting further clearance. The RIDAM unit would include one or more proximity sensors in the form of short-range radar, lidar, or video units that would generate movement-confirmation signals: that is, they would monitor positions of aircraft and ground vehicles and send information on those positions to the control tower. The RIDAM unit could include a transceiver that would interact with transponders on aircraft to identify or to confirm the identities of the aircraft. The RIDAM unit would periodically transmit, to the control tower, a “watchdog” signal, which would contain information on the statuses of the lights, sign, proximity sensor(s), and other components. A command processor in the RIDAM unit would automatically generate audible warnings to potential clearance violators and would both (1) broadcast the warnings locally via a short-range radio transmitter operating in a pre-existing aviation ground communication frequency band and (2) transmit the warnings to the control tower via the aforementioned free-space or carrier-current RF link.

*This work was done by Richard Dabney and Susan Elrod of Marshall Space Flight Center.*

*This invention is owned by NASA, and a patent application has been filed. For further information, contact Sammy Nabors, MSFC Commercialization Assistance Lead, at [sammy.a.nabors@nasa.gov](mailto:sammy.a.nabors@nasa.gov). Refer to MFS-32307-1.*

## Smaller But Fully Functional Backshell for Cable Connector

Features include reduced size, shield termination, strain relief, and protection against EMI.

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An improved design for the backshell of a connector for a shielded, multiple-wire cable reduces the size of the backshell, relative to traditional designs of backshells of otherwise identical cable connectors. Notwithstanding the reduction in size, the design provides all the functionality typically demanded of such a backshell, including (1) termination of the cable shield (that is, grounding of the shield to the backshell), (2) strain relief for the cable, and (3) protection against electromagnetic interference (EMI).

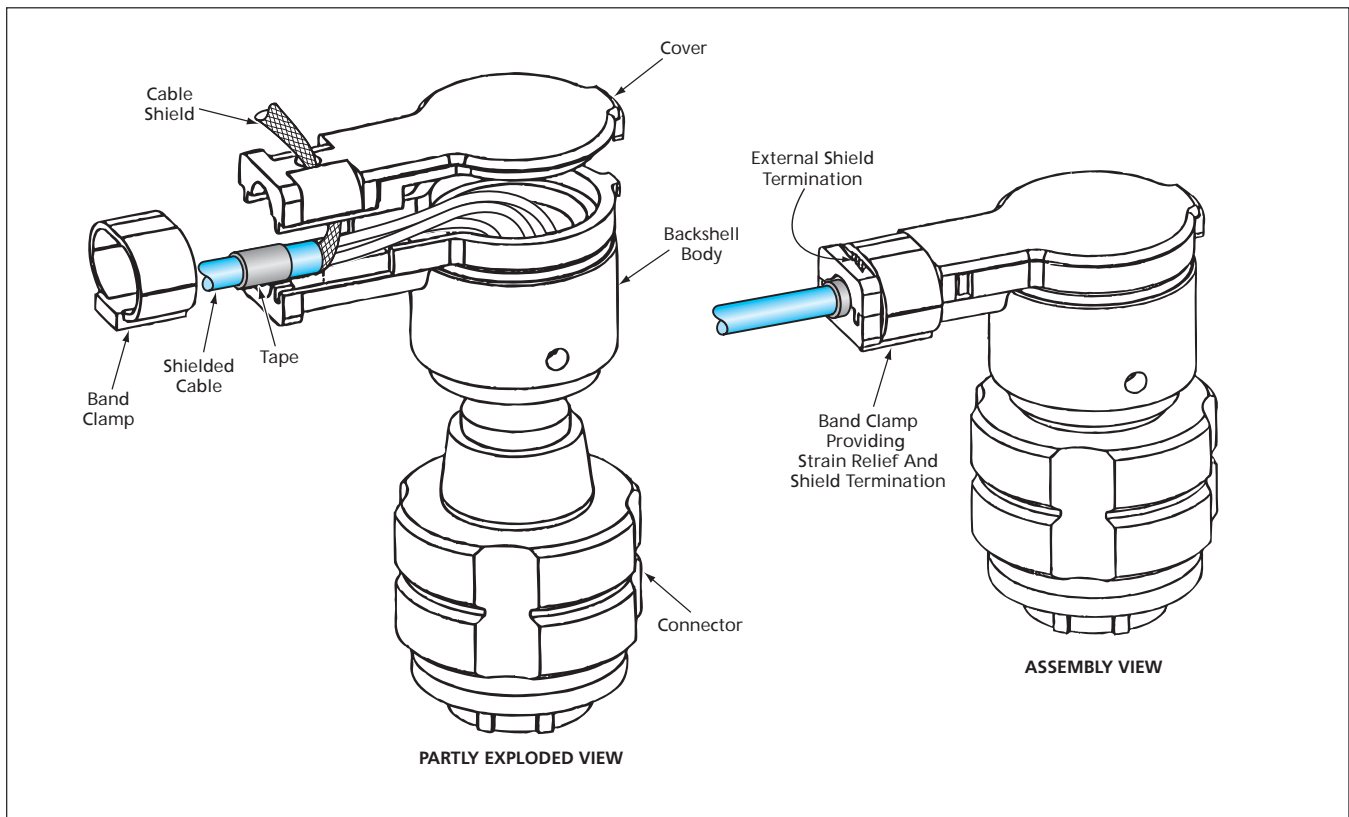
A traditional backshell design provides for termination of the cable shield

inside the backshell. To accommodate the shield, the interior of the backshell must contain wasted volume and, consequently, must be larger than would otherwise be necessary. The present improved design provides for termination of the cable shield on the outside of the backshell, thereby eliminating the need for wasted interior volume and enabling a reduction in size. In particular, the backshell is now only about one-third as large as a corresponding traditional backshell.

As shown in the figure, the improved backshell includes a backshell body, a cover, and a band clamp. There is a hole

in the backshell near its left (as shown in the figure) end to allow the cable shield to pass through to the outside of the backshell. The backshell body is fitted with a threaded coupling nut for securing this connector to a mating connector.

When the cover and the backshell are put together, lips in the form of mating corrugations along the edges of the cover and backshell help to prevent EMI by eliminating any straight path along which electromagnetic waves could penetrate to the cable wires. A male tab on the upper right corner of the backshell body mates with a female tab on the right end of the cover for latching the cover in



The Cable Shield Is Terminated on the Outside of the backshell instead of on the inside as in a traditional design. The mechanical and electrical integrity of the shield termination is ensured by squeezing of the shield between the cover and the band clamp.

place when the band clamp is tightened.

The procedure for assembling the cable, the backshell, and the rest of the connector is the following: The cable is placed through the coupling nut on the backshell body, the insulation on the cable wires is stripped back, and each wire is crimped to a connector pin. The pins are inserted in the connector. The coupling nut is threaded onto the connector. The shield (assumed to made of braided wire) pulled through the hole on the cover. Tape is wound around the cable near the left end of the backshell to provide strain relief. The cover is latched in place on the backshell body. The band clamp is tightened around the

cover/backshell-body assembly with the shield squeezed between the cover and the band clamp. Once electrical continuity between the shield and the backshell has been verified, the shield is trimmed and the cable is examined for proper strain relief.

If the cable is unshielded or if termination of the shield is not needed, then except for omission of the steps involving the cable shield, the assembly procedure remains as described above. The design of the backshell for such a case can also remain the same, except that optionally, the hole near the left end of the cover can be eliminated because it is not needed.

*This work was done by Chuong H. Diep of Hamilton Sundstrand Space Systems International, Inc. for Johnson Space Center.*

*Title to this invention, covered by U.S. Patent No. 7,044,795, has been waived under the provisions of the National Aeronautics and Space Act {42 U.S.C. 2457 (f)}. Inquiries concerning licenses for its commercial development should be addressed to:*

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*Refer to MSC-23670-1, volume and number of this NASA Tech Briefs issue, and the page number.*

## Glove-Box or Desktop Virtual-Reality System

**Multiple remote users can participate in a realistic simulation of a work space.**

*Ames Research Center, Moffett Field, California*

The figure depicts salient features of the optical layout of a desktop-scale virtual-reality system that is specialized for simulating a glove-box work space. The system generates stereoscopic left- and right-eye

images of the interior of the work space that show (1) a user extension (defined here as an arm, hand, and/or one or more of the fingers on the hand of a user) and (2) either a real or a virtual workpiece

to be manipulated by the user extension. The positions and orientations of the user extension and workpiece in the virtual images coincide substantially with those of the real user extension and of the real