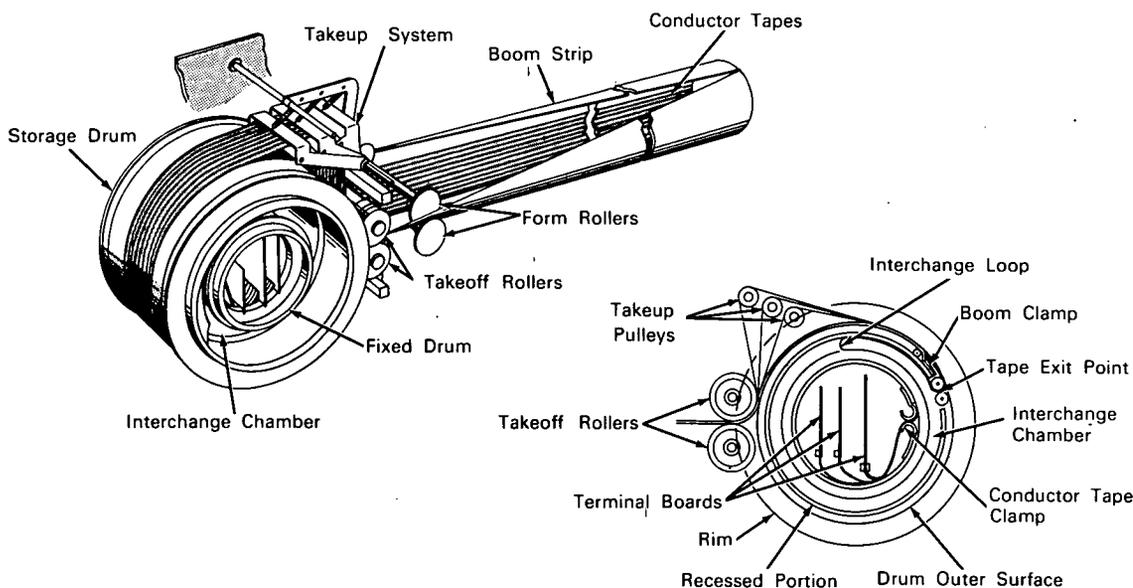


# NASA TECH BRIEF



This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the NASA space program.

## Metal Strip Forms 21 Foot Boom, Rolls Up for Compact Storage



**The problem:** To design an extensible boom that will fold or retract into a minimum amount of space. In certain research situations, such as use aboard a space vehicle, a boom is needed that will carry electrical conductors yet be capable of compact storage. Available designs either are too bulky or they are not suitable for carrying the electrical conductors.

**The solution:** A boom constructed from a metal strip that can be rolled into a storage drum. This design will carry three separate electrical conductor tapes. When extended, the boom has an effective length of 21 feet. Tape is curved in cross section so that the boom automatically forms a tube shape as it is extended.

**How it's done:** A flat beryllium copper strip 4 inches wide by 0.005 inch, heat treated into a tubular shape, forms the structural member of this extensible boom. The strip can be extended or retracted by a motor drive mechanism and rolled into a storage drum approximately 3 inches in diameter. When the boom is formed, as the strip unwinds, the edges overlap slightly resulting in a cross section that is almost, but not quite, circular with a nominal diameter of 1.25 inches. Three conductor tapes also extend or retract with the boom and are enclosed by the copper strip as it forms into a tube shape.

The conductor tapes are wound on the storage drum by an "interchange loop" method. Since the boom strip and the conductor tapes are fixed

(continued overleaf)

at their inner ends, the interchange chamber provides the means of winding and unwinding without affecting the stationary ends of the boom and tapes.

Two drums are actually needed for the storage drum. One, a smaller core drum, is mounted to the sideplates and remains stationary. The larger main storage drum is rotated by an electric motor. Between the two drums there is a space called the interchange chamber. When the boom and conductor tapes are retracted, rollers first flatten the tapes, which then are fed through a slot, reversed in direction, and reversed again to form a loop. As the outer drum turns, the slot and tape loop cause the tapes to wrap around the stationary inner drum.

**Notes:**

1. This compact extensible boom system might be applied to the design of antenna mechanisms for aircraft and for mobile radio and TV vehicles.
2. For further information about this innovation inquiries may be directed to:

Technology Utilization Officer  
Goddard Space Flight Center  
Greenbelt, Maryland 20771  
Reference: B64-10011

**Patent status:** NASA encourages commercial use of this innovation. No patent action is contemplated.

.Source: Canadian Commercial Corporation  
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