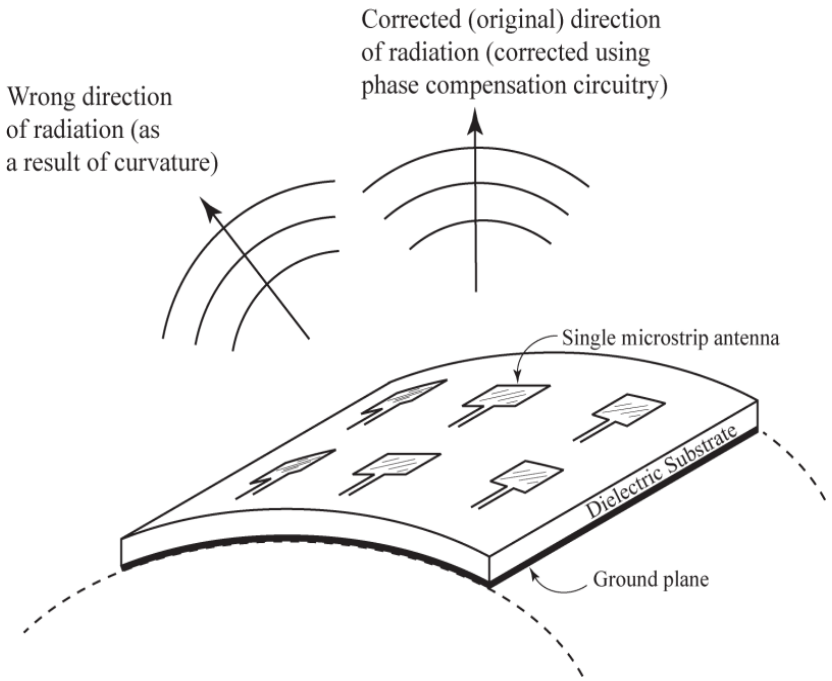
A Small Wearable Conformal Phased Array Antenna for Wireless Communications

Benjamin Braaten, NDSU, Fargo, ND.

Overview: this project is investigating the possibility of embedding flexible sensors into the design of a flexible antenna array to compensate for surface curvature.

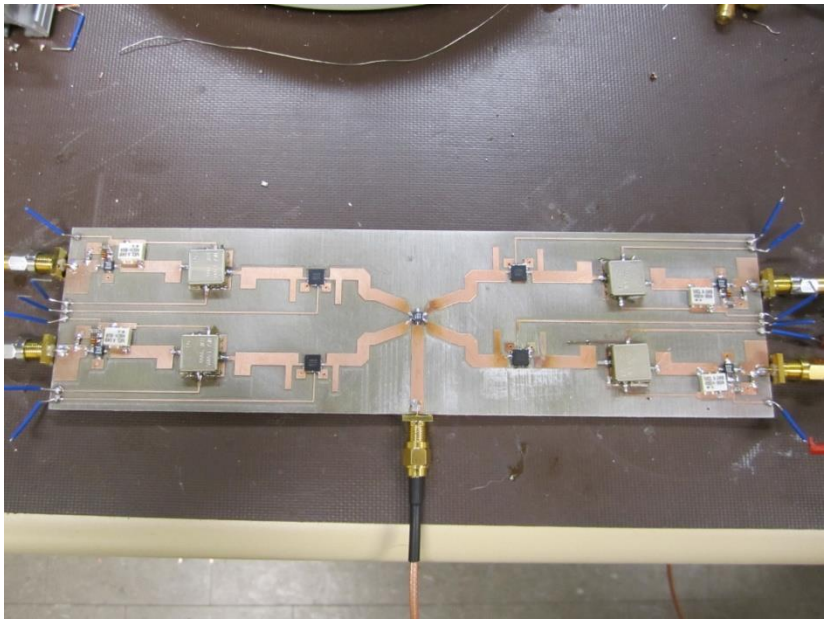


Relevance to NASA:

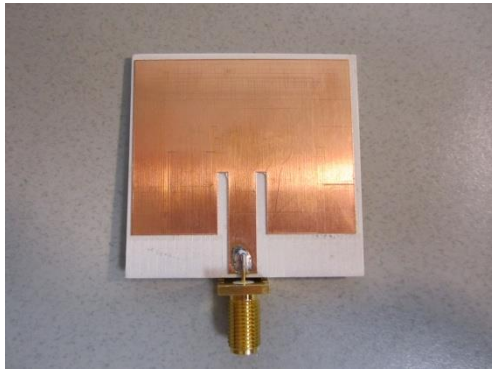
1) Space suits – wearable
2) Satellites – temperature gradients
3) Remote operated vehicles – new surfaces
4) Remote sensing – conformal enclosures

Accomplished so far:

1) Layout of the TAI completed
2) Four-port phase-shifter, attenuator and amplifier circuit



3) Patch antenna



4) Test fixture

Collaborations Established:

1) Dr. Neil Chamberlain
   Senior Engineer, Spacecraft Antennas Group,
   Acting Supervisor, Spacecraft Antenna Research Group
   Jet Propulsion Laboratory (JPL)
   Pasadena CA.
2) Dr. Michael Reich
   Senior Research Engineer,
   Center for Nanoscale Science and Engineering (CNSE),
   North Dakota State University, Fargo ND.
3) Brian Morlock
   Senior Research Engineer,
   Packet Digital, LLC, Fargo ND.
4) M.S. Students – NDSU – Sayan Ray, Sanjay Nariyal,
   Zhou Tan and Ronghua Yu.
5) Undergraduate Student – NDSU – David Fischer.

Future plans:

1) Currently, we have the following two proposals under review:
   a) Collaborative Research: EMTEL – An Intelligent Electromagnetic Field Sensor, National Science Foundation.
   b) A Novel DPC Based Wireless Multi-Network Co-existence Paradigm: Concept, Design and Implementation.
2) We are also discussing the possibilities of extending this work with JPL for applications that include deformation of satellite antennas due to extreme temperature changes.