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Preface to the Special Section

“Radio Astronomy: a continuous demand for breakthrough technology”

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Radio astronomy is a relatively young science: about an average human lifetime has passed since Karl Jansky’s measurement campaign took place at Holmdel, New Jersey in the early 1930s, now celebrated as the birth date of Radio Astronomy. Most people working in the field today can claim to have personally known the pioneers in their countries. In the case of Italy, one such pioneer was Gianni Tofani who passed away in February 2015. He fully devoted his professional life to scientific and technological research in astrophysics, mainly from the wonderful Arcetri hill of his beloved city Florence. Furthermore, his management style was highly respected, bringing him to hold leadership positions such as the Director of the Institute of Radio Astronomy.

Among his memberships to different scientific councils, Gianni was also President of the Italian section of URSI, and it is here, in a Special Section of this journal, that we celebrate his memory and acknowledge his contributions to the field. The Editors of this Special Section have worked closely with Gianni over the past twenty years and have appreciated his professional and human qualities. It has been easy and satisfying to receive an enthusiastic “Yes” when calling for a contribution to this Section from worldwide authors, not only top quality researchers in their respective fields but also, mainly, very good friends. The Editors wish to kindly thank them all for their valuable contributions, which show complementary perspectives of technological advances in radio astronomy.

Due to the high number of papers constituting this Special Section, it will be divided over two issues of the Radio Science Bulletin. The first part, published in this issue, opens with two remembrances of Gianni Tofani from distinguished authors, A. van Ardenne (ASTRON, The Netherlands) and G. Pelosi (University of Florence, Italy). Then, several different technological topics applied to the radio astronomical research are authoritatively encompassed and reviewed: from mechanical engineering to digital and analog electronics, from very low frequency receiving systems to submillimeter wavelength spectroscopic cameras, from metrology to signal processing techniques. However, there is a common thread among all of them: developing advanced technology for improving our knowledge of the Universe. *This was exactly what Gianni Tofani pursued throughout his professional life.*

In this issue, we have the following papers:

- J. W. M. Baars (MPIfR, Germany) and H. J. Kärcher (MT Mechatronics, Germany), “Seventy years of Radio Telescope Design and Construction”
- R. F. Bradley (NRAO, USA), “The Precision Array for Probing the Epoch of Reionization (PAPER): A Modern Scientific Adventure”
- P. F. Goldsmith (JPL, USA), “Submillimeter Heterodyne Focal Plane Arrays for High Resolution Astronomical Spectroscopy”

The next issue will contain contributions on the Sardinia Radio Telescope, the Square Kilometer Array, and the Atacama Large Millimeter Array respectively from N. D’Amico (INAF, Italy), P. Diamond and R. Braun (SKA Organization, UK) and L. Testi (ESO, Germany).