SOLID CRYOGEN COOLING SYSTEM FOR FOCAL PLANE ARRAYS

A cryogenic cooling system (12) for cooling electromagnetic energy detectors (50). The cooling system (12) includes a first mechanism (18) that accommodates cryogen fluid in one or more spaces (58, 60). A second mechanism (16, 42) freezes the cryogen fluid in the one or more spaces (58, 60) adjacent to the electromagnetic detectors (50). In a specific embodiment, the electromagnetic detectors (50) comprise an infrared focal plane array (50). The second mechanism (16, 42) includes a heat exchanger (16) that is mounted separately from the first mechanism (18). The one or more spaces (58, 60) are fitted with three-dimensional cooling interface surfaces (62, 64). The three-dimensional cooling surfaces (62, 64) are implemented via a thermally conductive matrix (62, 64). The thermally conductive matrix (62, 64) is a copper metal matrix or a carbon/graphite matrix, and the solid cryogen reservoir (18) is a beryllium reservoir (18).
Published:
— with international search report
— before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : F17C 13/08
US CL : 62/53.2
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S. : 62/53.2, 45.1, 46.1, 47.1, 51.2, 54.2

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>US 5,974,808 A (MANGAN et al.) 02 November 1999, entire document.</td>
<td>1-30</td>
</tr>
<tr>
<td>A</td>
<td>US 6,070,414 A (ROSS et al.) 06 June 2000, entire document.</td>
<td>1-30</td>
</tr>
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</table>

Further documents are listed in the continuation of Box C.

See patent family annex.

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25 January 2004 (25.01.2004)

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