Subject: Fwd: radio astronomy
From: Deborah Vane <dvane@mail1.jpl.nasa.gov>
Date: Fri, 25 Jun 2004 10:45:34 -0700
To: demerson@nrao.edu, jzuzek@grc.nasa.gov
CC: Stephen.L.Durden@jpl.nasa.gov, Ronald.J.Boain@jpl.nasa.gov, Mark.J.Rokey@jpl.nasa.gov, Thomas.R.Livermore@jpl.nasa.gov

Gentlemen,

I am the Deputy Principal Investigator for the NASA CloudSat Mission. You previously had discussions with Steve Durden, the CloudSat radar Systems Engineer (emails appended below), and Steve asked me if I could help by picking up the thread of those discussions and moving forward. CloudSat is to be launched in April 2005, and I would like to talk with you -- or the people you designate -- to begin to work out a means of minimizing the impact of our mission on ground-based astronomy over the 22-month mission lifetime.

As you recall, the CloudSat radar (94 GHz) is a single footprint (~1.5 km wide) along the ground-track of the satellite in polar orbit at ~705 km altitude. The orbit repeats exactly every 16 days. We are developing a satellite overpass prediction tool that will be web-based; this would allow radio astronomy sites to know long in advance - and with repeatability on a 16-day cycle - when the CloudSat radar would be in the field-of-view and whether it will be overhead or in some other location. Our orbit is approximately 90 minutes, so the total overpass time over a site is less than 15 minutes.

Since many of these emails are dated from several years ago, I would first like to confirm that I am contacting the right people, and then I would like to set up a conference call to discuss your concerns and to develop, as best we can, the tools and procedures to minimize the impact of our mission.

With best regards,
Deborah Vane

> Date: Fri, 14 May 2004 16:42:34 -0700
> From: Steve Durden <sdurden@jpl.nasa.gov>
> Subject: radio astronomy
> To: deborah.g.vane@jpl.jpl.nasa.gov

X-Accept-Language: en-us, en
Original-recipient: rfc822;deborah.g.vane@jpl.JPL.NASA.GOV

Deb,

Mark Rokey mentioned that you might have time to take over looking at what is required of us to coordinate with radio astronomy. I had some correspondence with several in that community. I attached all the emails that were exchanged, for your information.

Steve

--

****
Stephen L. Durden
Supervisor, Experimental Radar Group
JPL 300-243, 4800 Oak Grove Dr.
Pasadena, CA 91109 USA

(818)354-4719 (ph) (818)393-5285 (fx) sdurden@jpl.nasa.gov
****

>From jzuzek@grc.nasa.gov Thu Dec 21 07:49 PST 2000
Received: from fringe.jpl.nasa.gov (fringe [137.78.28.81])
by kappa.jpl.nasa.gov (8.9.3/8.9.1/JPLRsol2.jhk-1.7a) with ESMTP id HAA07946
for <durden@kappa.jpl.nasa.gov>; Thu, 21 Dec 2000 07:49:01 -0800 (PST)
Received: from eis-msg-021.jpl.nasa.gov (eis-msg-021.jpl.nasa.gov [137.78.160.201])
by fringe.jpl.nasa.gov (8.9.3/8.9.3) with ESMTP id HAA01626
for <durden@fringe.jpl.nasa.gov>; Thu, 21 Dec 2000 07:49:00 -0800 (PST)
Received: from lombok-fi.lerc.nasa.gov by eis-msg-021.jpl.nasa.gov with ESMTP; Thu, 21 Dec 2000 07:48:43 -0800
Received: from apataki-fi.lerc.nasa.gov (apataki-fi.lerc.nasa.gov [139.88.112.35])
by lombok-fi.lerc.nasa.gov (NASA LeRC 8.9.1.1/8.9.1) with ESMTP id KAA12914;
Thu, 21 Dec 2000 10:48:34 -0500 (EST)
Received: from JZUZEK (jzuzek.lerc.nasa.gov [139.88.87.33]) by apataki-fi.lerc.nasa.gov with ESMTP (NASA LeRC 8.7.4.1/2.01-local)
id KAA18024; Thu, 21 Dec 2000 10:48:33 -0500 (EST)
Message-Id: <4.2.1.20001221103741.00adbe80@popserve.grc.nasa.gov>
X-Sender: cazuzek@popserve.grc.nasa.gov
X-Mailer: QUALCOMM Windows Eudora Pro Version 4.2.1
Date: Thu, 21 Dec 2000 10:48:12 -0500
To: Klaus Ruf <kruf@mpifr-bonn.mpg.de>
From: John E Zuzek <jzuzek@grc.nasa.gov>

Subject: Re: 94 GHz cloud radar
Cc: Tomas Gergely <tgergely@nsf.gov>, Ted Peng <Ted.K.Peng@jpl.nasa.gov>,
        Steve Durden <sdurden@jpl.nasa.gov>
In-Reply-To: <3.0.32.20001219104854.0068bc54@mpifr-bonn.mpg.de>
Mime-Version: 1.0
Content-Type: multipart/alternative;
    boundary="====================_927591==_.ALT"
Content-Length: 6315
Status: R

--====================_927591==_.ALT
Content-Type: text/plain; charset="us-ascii"; format=flowed

At 10:48 AM 12/19/2000 +0100, Klaus Ruf wrote:
> I hear rumors that NASA is moving a 94 GHz cloud radar instrument slowly
> toward the launch pad.

"Slowly" would be apt terminology. It is known as CLOUDSAT and it is scheduled for a 2003 launch. Some preliminary information on the mission can be found at http://cloudsat.atmos.colostate.edu/ . Additionally, you (and/or Tom) could contact he CLOUDSAT system engineer, Dr. Steve Durden at +1 818 354 4719. I am told that he has been wanting to talk to the radio astronomers for some time. His e-mail is: sdurden@jpl.nasa.gov

Happy Holidays!

- John Zuzek

> Some years ago, when the cloud radar allocation was shifted towards this
> higher frequency, we thought that it would be possible to co-ordinate our
> operations. Now, that the allocation table has been changed, I think this
> is even more obviously a necessity. I have not heard of any dicsussions
> between our communities (and I hope you correct me, Tom, if I am wrong),
> so may I start the ball rolling and ask for NASA's plans, timewise,
> frequencywise, and co-odinationwise?
> Best regards,
>
> Klaus
>
>
>
> _____
> () Klaus Ruf   ()
> () Max-Planck-Institut fuer Radioastronomie   ()

```
  () Auf dem Huegel 69                                  ()
  () D-53121 Bonn, Germany                              ()
  () Tel.: +49 228 525255                               ()
  () Fax.: +49 228 525229_____________________          ()
  </blockquote></x-html>



**********************************************************************
* John E. Zuzek                      Remote Sensing Spectrum
Manager
* NASA Spectrum Management Office    Ph:  216-433-3469
* Glenn Research Center              FAX: 216-977-7444
* 21000 Brookpark Rd.  MS 54-2       e-mail: jzuzek@grc.nasa.gov
* Cleveland, OH  44135 USA              or  john.zuzek@ties.itu.int
**********************************************************************

  From tgergely@nsf.gov Tue Jan  2 11:24 PST 2001
Received: from fringe.jpl.nasa.gov (fringe [137.78.28.81])
    by kappa.jpl.nasa.gov (8.9.3/8.9.1/JPLRsol2.jhk-1.7a) with ESMTP id LAA11565
    for <durden@kappa.jpl.nasa.gov>; Tue, 2 Jan 2001 11:24:31 -0800 (PST)
Received: from eis-msg-021.jpl.nasa.gov (eis-msg-021.jpl.nasa.gov [137.78.160.201])
    by fringe.jpl.nasa.gov (8.9.3/8.9.3) with ESMTP id LAA10911
    for <durden@fringe.jpl.nasa.gov>; Tue, 2 Jan 2001 11:24:29 -0800 (PST)
Received: from malus.nsf.gov by eis-msg-021.jpl.nasa.gov for sdurden@jpl.nasa.gov; Tue, 2 Jan 2001
11:24:29 -0800
Received: by malus.nsf.gov; id OAA18514; Tue, 2 Jan 2001 14:24:25 -0500
Received: from note1.nsf.gov(128.150.11.1) by malus.nsf.gov via smap (V5.5)
    id xma018380; Tue, 2 Jan 01 14:23:55 -0500
Received: from nsfmail06.nsf.gov (nsfmail06.nsf.gov [128.150.130.45])
    by note1.nsf.gov (8.8.8/8.8.8) with ESMTP id OAA25168;
    Tue, 2 Jan 2001 14:23:55 -0500
Received: by nsfmail06.nsf.gov with Internet Mail Service (5.5.2652.78)
    id <ZH4RS5LM>; Tue, 2 Jan 2001 14:23:54 -0500
Message-Id: <1362B6AB3C3FD411A2E6009027FC98FC075A8B@nsfmail06.nsf.gov>
From: "Gergely, Tomas E" <tgergely@nsf.gov>
To: "'sdurden@jpl.nasa.gov'" <sdurden@jpl.nasa.gov>
Cc: "'Ruf, Klaus'" <kruf@mpifr-bonn.mpg.de>
Subject: Cloud Profiling Radar
Date: Tue, 2 Jan 2001 14:23:48 -0500
MIME-Version: 1.0
X-Mailer: Internet Mail Service (5.5.2652.78)
Content-Type: text/plain
Content-Length: 662
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Status: R

Hi Steve:

I thought I would touch base with you given that John Zuzek tells us that at some point in your work
you would like to contact someone from the radio astronomy community, regarding potential interference to our faclities from the cloud profiling radar on CLOUDSAT.

Let me know if I can be of help. At some future date we should discuss how information on
Cloudsat (orbital elements, etc.) will be provided to the astronomical community.

Best regards

Tom

Tomas Gergely Phone: 703-292-4896
Electromagnetic Spectrum Manager FAX: 703-292-9034
National Science Foundation E-mail: tgergely@nsf.gov
4201 Wilson Blvd.
Arlington, VA
22230

Subject: Re: Cloud Profiling Radar
Date: Wed, 03 Jan 2001 13:57:53 -0800
From: steve durden <sdurden@jpl.nasa.gov>
To: "Gergely, Tomas E" <tgergely@nsf.gov>
CC: kruf@mpifr-bonn.mpg.de, jzuzek@grc.nasa.gov
References: 1

Dear Tom:

Thanks for your email. I had been wanting to contact the radio astronomy community, as I understand that there is concern about the effect of CloudSat's radar on radio astronomy facilities. I would be happy to provide details on the instrument and mission. Also, I would like to discuss the radio astronomy community's needs during the mission. Fortunately, because of CloudSat radar's narrow beamwidth (about .12 degrees) and nadir-looking geometry, the probability of coupling our mainbeam with a radio astronomy facility's mainbeam is small (but not zero). We are developing an Operating Procedures for the instrument, and I would like to include reasonable procedures to protect radio astronomy in this document. This could include, for example, maintaining a web site with the latest Cloudsat orbital parameters and projected ground track.

Steve

From kruf@mpifr-bonn.mpg.de Mon Jan 8 05:52 PST 2001
Received: from fringe.jpl.nasa.gov (fringe [137.78.28.81])
by kappa.jpl.nasa.gov (8.9.3/8.9.1/JPLRsol2.jhk-1.7a) with ESMTP id FAA00953
for <durden@kappa.jpl.nasa.gov>; Mon, 8 Jan 2001 05:52:22 -0800 (PST)
Received: from eis-msg-021.jpl.nasa.gov (eis-msg-021.jpl.nasa.gov [137.78.160.201])
by fringe.jpl.nasa.gov (8.9.3/8.9.3) with ESMTP id FAA13005
for <durden@fringe.jpl.nasa.gov>; Mon, 8 Jan 2001 05:52:20 -0800 (PST)
Received: from mpifr-bonn.mpg.de by eis-msg-021.jpl.nasa.gov with ESMTP for sdurden@jpl.nasa.gov;
Mon, 8 Jan 2001 05:52:20 -0800
Received: from moritz.mpifr-bonn.mpg.de (moritz [134.104.31.24])
by mail.mpifr-bonn.mpg.de (8.8.8+Sun/8.8.8) with SMTP id OAA08428;
Mon, 8 Jan 2001 14:52:14 +0100 (MET)
Message-Id: <3.0.32.20010108145213.007167c4@mpifr-bonn.mpg.de>
X-Sender: kruf@mpifr-bonn.mpg.de
X-Mailer: Windows Eudora Pro Version 3.0 (32)
Date: Mon, 08 Jan 2001 14:52:18 +0100
To: steve durden <sdurden@jpl.nasa.gov>
From: Klaus Ruf <kruf@mpifr-bonn.mpg.de>
Subject: Re: Cloud Profiling Radar
Cc: Tomas Gergely <tgergely@nsf.gov>
Mime-Version: 1.0
Content-Transfer-Encoding: quoted-printable
Content-Type: text/enriched; charset="iso-8859-1"
Content-Length: 2701
Status: R

Hi Steve,

thanks for copying your mail also to me. (Tom, thanks for taking the=
initiative.) =20

If CloudSat has such a narrow beam and is always nadir-looking, coordination=
should not be a very difficult task. And if you are just about to develop=
an operating procedure, let me frankly ask you, if you could switch the=
instrument to stand-by, when it is illuminating one of roughly a dozen=
mm-wave observatories, world-wide, the coordinates of which we would=
provide? If this would be feasible, we could effectively exclude=
mainbeam-to-mainbeam coupling, even if the radiotelescope looks to the=
zenith. I have no idea, how sensitive your experiment is to short=
interruptions or loss of pixels, I'm just trying to make things simple.=
Additionally, we would probably need to avoid looking at the satellite, or=
close to the satellite, in order not to spoil our data. To which extend=
this is necessary will depend on the satellite antenna beam pattern, the=
power flux density of its transmission at the surface of the earth, and the=
out-of-band emission spectrum. This would be the additional information we=
request from you. The corresponding parameters on our side, beam pattern=
and sensitivity, can certainly be made available by the observatories,=
through Tom or myself. But let me first get your feeling on the idea to=
include a switch into the satellite operations software.=20

Kind regards,

Klaus

At 13:57 03.01.01 -0800, you wrote, with a copy to me:

> Dear Tom:
>
> Thanks for your email. I had been wanting to contact the radio astronomy
> community, as I understand that there is concern about the effect of=
CloudSat's

> radar on radio astronomy facilities. I would be happy to provide details=
> on
>
> the instrument and mission. Also, I would like to discuss the radio=
> astronomy
>
> community's needs during the mission. Fortunately, because of CloudSat=
> radar's
>
> narrow beamwidth (about .12 degrees) and nadir-looking geometry, the
>
> probability of coupling our mainbeam with a radio astronomy facility's=
> mainbeam
>
> is small (but not zero). We are developing an Operating Procedures for the
>
> instrument, and I would like to include reasonable procedures to protect=
> radio
>
> astronomy in this document. This could include, for example, maintaining a=
> web
>
> site with the latest Cloudsat orbital parameters and projected ground=
> track.
>
>
> Steve

() Klaus Ruf ()

() Max-Planck-Institut fuer Radioastronomie ()

() Auf dem Huegel 69 ()

() D-53121 Bonn, Germany ()

() Tel.: +49 228 525255 ()

<underline>() Fax.: +49 228 525229</underline>_____ ()

Subject:
Re: Cloud Profiling Radar
Date:
Wed, 10 Jan 2001 08:47:45 -0800
From:
steve durden <sdurden@jpl.nasa.gov>
To:
Klaus Ruf <kruf@mpifr-bonn.mpg.de>
CC:
Tomas Gergely <tgergely@nsf.gov>
References:
1

Dear Klaus,

Concerning turning off Cloudsat over ground sites, I had actually considered this. For Cloudsat there are two disadvantages. First, it would produce some small gaps in the data. Second, Cloudsat is advertised as being a fairly low maintenance mission - each thing we add that requires ground commanding adds to the cost. However, it may be possible to live with these effects.

Because of the small beamwidth (about a 1.5 km spot on the surface), the time required for non-operation would be very small. Hence the data gaps would be small. Also, if there are only about a dozen sites, I would guess that the probability of our passing directly over a site is small. I will ask our guys doing orbits to estimate the frequency with which a particular spot at mid-latitude is crossed. If that number times 12 or so results in a small number of crossings, we might be able to handle this. Also, I checked with the operations people yesterday and they might be able to program in the radio astronomy locations and handle the on-off-on commanding without much trouble.

I can't promise anything at the moment, since the decision to turn off over these sites isn't mine. For its impact on mission operations, I will consult with the mission ops group. For the impact of small gaps, I will consult with the science team.

Do you have a list of mm-wave sites worldwide? I would like to know what the real number of sites is when I start asking questions. Also, we would need to fix the sites in the not-too-distant future. I

wouldn't want to have new sites coming forward demanding that we also turn off over them. I think if the list is and will continue to be about a dozen, this is at least a possibility.

Best Regards,

Steve

Subject:
Re: Cloud Profiling Radar
Date:
Wed, 31 Jan 2001 15:04:00 -0800
From:
steve durden <sdurden@jpl.nasa.gov>
To:
"Gergely, Tomas E" <tgergely@nsf.gov>, kruf@mpifr-bonn.mpg.de
References:
1 , 2

Dear Tom and Klaus:

I was wondering if either of you has had any luck in trying to come up with a list of precise locations for radio astronomy observatories around the world. I've had discussions with a number of project and missions operations personnel and it looks like turning off CPR will be difficult (i.e. a lot more work) for the mission operations. Also, there are some concerns about instrument health in turning it off in short bursts. Another aspect of turning off the instrument is the possibility that the command would not be sent or received properly. It is not clear whether it would be wise to risk radio astronomy assets solely on our turning off the radar.

In spite of these disadvantages to turning off the radar, I would still like to investigate how often the radar crosses sites for the planned orbit. In particular, the orbit is a repeat track, so it is quite possible that most sites will never be flown over directly. Any help that you could provide in the next couple of weeks would allow me to get accurate coordinates to our orbit analyst. He could then do a study of frequency of overpasses by site.

Steve

```
 From kruf@mpifr-bonn.mpg.de Thu Jan 11 01:24 PST 2001
Received: from fringe.jpl.nasa.gov (fringe [137.78.28.81])
    by kappa.jpl.nasa.gov (8.9.3/8.9.1/JPLRsol2.jhk-1.7a) with ESMTP id BAA03398
    for <durden@kappa.jpl.nasa.gov>; Thu, 11 Jan 2001 01:24:04 -0800 (PST)
Received: from eis-msg-021.jpl.nasa.gov (eis-msg-021.jpl.nasa.gov [137.78.160.201])
    by fringe.jpl.nasa.gov (8.9.3/8.9.3) with ESMTP id BAA16497
    for <durden@fringe.jpl.nasa.gov>; Thu, 11 Jan 2001 01:24:03 -0800 (PST)
Received: from mpifr-bonn.mpg.de by eis-msg-021.jpl.nasa.gov with ESMTP for sdurden@jpl.nasa.gov;
Thu, 11 Jan 2001 01:24:03 -0800
Received: from moritz.mpifr-bonn.mpg.de (moritz [134.104.31.24])
    by mail.mpifr-bonn.mpg.de (8.8.8+Sun/8.8.8) with SMTP id KAA13238;
    Thu, 11 Jan 2001 10:24:01 +0100 (MET)
Message-Id: <3.0.32.20010111102401.00722e68@mpifr-bonn.mpg.de>
X-Sender: kruf@mpifr-bonn.mpg.de
X-Mailer: Windows Eudora Pro Version 3.0 (32)
Date: Thu, 11 Jan 2001 10:24:01 +0100
To: steve durden <sdurden@jpl.nasa.gov>
From: Klaus Ruf <kruf@mpifr-bonn.mpg.de>
Subject: Re: Cloud Profiling Radar
Cc: Tomas Gergely <tgergely@nsf.gov>
Mime-Version: 1.0
Content-Transfer-Encoding: quoted-printable
Content-Type: text/enriched; charset="iso-8859-1"
Content-Length: 2089
Status: R

Dear Steve,

thanks for your e-mail. I'm glad to hear that you already considered the=
 same idea, and if we can agree on a set of sites, this will probably result=
 in a simple solution. Under the assumption that the satellite knows its=
 position,  the idea to tell the satellite right before the launch, where to=
 switch, could avoid later interventions. Another way would be, to=
 coordinate only, while a particular site is observing in the 3mm band. This=
 would require actual switching under ground controll and also cost us=
 flexibility.

The mm observatories are certainly listed somewhere, but I don't have that=
 list at hand.  No problem, I'll find it, or writeit. The number is=
 certainly not a fixed number, if you count any receiver, which may be=
 pointed out of the window at an university lab for test purposes, but for=
 the purpose of coordinating with you, we could probably produce a list of=
 the professional sites, and, if necessary, cut off this list somewhere. A=
```

dozen may not be exactly 12 in that case, but certainly not much bigger. By=
the way: mm observatory sites are chosen to be free from clouds all the=
time, so, if your instrument switches off over an observatory, it may=
safely assume that there are no clouds, therefore, in effect, you don't=
loose data at all (this is not a pure joke, but partly also a question).=
Counting the sites, which just come to my mind, I arrive at ten, but I'm=
sure there are a few more. Could you try out 15 on your operations people?=
(What do you think,Tom?) I will try to get together a list of sites with=
coordinates.

Apart from that, it would be good to have a beam pattern and spfd values,=
because the 1.5 km spot is certainly not the whole story. Is this=
information available already?

Best regards,

Klaus

_____

() Klaus Ruf ()

() Max-Planck-Institut fuer Radioastronomie ()

() Auf dem Huegel 69 ()

() D-53121 Bonn, Germany ()

() Tel.: +49 228 525255 ()

<underline>() Fax.: +49 228 525229</underline>_____ ()

From kruf@mpifr-bonn.mpg.de Thu Feb 1 05:21 PST 2001
Received: from fringe.jpl.nasa.gov (fringe [137.78.28.81])
by kappa.jpl.nasa.gov (8.9.3/8.9.1/JPLRsol2.jhk-1.7a) with ESMTP id FAA01965
for <durden@kappa.jpl.nasa.gov>; Thu, 1 Feb 2001 05:21:11 -0800 (PST)
Received: from eis-msg-021.jpl.nasa.gov (eis-msg-021.jpl.nasa.gov [137.78.160.201])
by fringe.jpl.nasa.gov (8.9.3/8.9.3) with ESMTP id FAA06231
for <durden@fringe.jpl.nasa.gov>; Thu, 1 Feb 2001 05:21:18 -0800 (PST)

Received: from mpifr-bonn.mpg.de by eis-msg-021.jpl.nasa.gov with ESMTP for sdurden@jpl.nasa.gov;
Thu, 1 Feb 2001 05:21:10 -0800
Received: from moritz.mpifr-bonn.mpg.de (moritz [134.104.31.24])
    by mail.mpifr-bonn.mpg.de (8.8.8+Sun/8.8.8) with SMTP id OAA06493;
    Thu, 1 Feb 2001 14:21:08 +0100 (MET)
Message-Id: <3.0.32.20010201142108.006af45c@mpifr-bonn.mpg.de>
X-Sender: kruf@mpifr-bonn.mpg.de
X-Mailer: Windows Eudora Pro Version 3.0 (32)
Date: Thu, 01 Feb 2001 14:21:08 +0100
To: steve durden <sdurden@jpl.nasa.gov>
From: Klaus Ruf <kruf@mpifr-bonn.mpg.de>
Subject: Re: Cloud Profiling Radar
Cc: Tomas Gergely <tgergely@nsf.gov>
Mime-Version: 1.0
Content-Type: text/enriched; charset="us-ascii"
Content-Length: 898
Status: R

Dear Steve,

Tom doesn't seem to have a list ready, so I'll do it. Give me just a day or two, because I have to finish something else first.

I'm working on a workshop program on rfi mitigation techniques. In that context, I found a paper, written by JPL people, about a Spectral Analysis Tool (SAT) for RFI analysis. It looks like a nice toy to play with, and I wonder, wether it is publicly available. The authors are V.Y. Lo; F, Chen, and J.Rucker. If you know these colleagues or their software, could you perhaps aks them? If not, you could certainly help me with an actual email address?

Best regards,

Klaus

() Klaus Ruf ()

() Max-Planck-Institut fuer Radioastronomie ()

() Auf dem Huegel 69 ()

() D-53121 Bonn, Germany ()

() Tel.: +49 228 525255 ()

<underline>() Fax.: +49 228 525229</underline>_____ ()

? r
To: kruf@mpifr-bonn.mpg.de
Subject: Re: Cloud Profiling Radar

Klaus,

I tried looking for the authors and also doing a search of our websites and
couldn't find any info on the authors or the tool. The authors may not be at
JPL any more. The tool may be available outside JPL, although there might
be restrictions on exporting it outside the US. I'll try to check some more -
I might find it useful myself.

As for the list of sites, getting it to me by middle or late next week would
be fine. I spent sometime trying to compile such a list from the web and
had limited success. I found exact loactions for a few sites but had to
make guesses for many others. Since we are using a repeat-track orbit,
the precise locations matter, so thanks for your help.

Steve

From Pedro.Baptista@esa.int Fri Feb 16 05:41 PST 2001
Received: from fringe.jpl.nasa.gov (fringe [137.78.28.81])
by kappa.jpl.nasa.gov (8.9.3/8.9.1/JPLRsol2.jhk-1.7a) with ESMTP id FAA04817
for <durden@kappa.jpl.nasa.gov>; Fri, 16 Feb 2001 05:41:40 -0800 (PST)
From: Pedro.Baptista@esa.int
Received: from eis-msg-021.jpl.nasa.gov (eis-msg-021.jpl.nasa.gov [137.78.160.201])
by fringe.jpl.nasa.gov (8.9.3/8.9.3) with ESMTP id FAA27842
for <durden@fringe.jpl.nasa.gov>; Fri, 16 Feb 2001 05:41:52 -0800 (PST)
Received: from esacom44.estec.esa.nl by eis-msg-021.jpl.nasa.gov with ESMTP for sdurden@jpl.nasa.gov;
Fri, 16 Feb 2001 05:41:18 -0800
Received: from esacom52.estec.esa.nl (esacom52.estec.esa.nl [131.176.7.7])
by esacom44.estec.esa.nl (8.9.2/8.9.2/ESA-ESTEC-v1.2) with ESMTP id OAA28171;
Fri, 16 Feb 2001 14:39:01 +0100 (MET)
Received: from estecmail1.estec.esa.nl (estecmail4.estec.esa.nl [131.176.7.65])
by esacom52.estec.esa.nl (8.9.2/8.9.2/ESA-ESTEC-mail-gw-v1.6) with SMTP id NAA16726;
Fri, 16 Feb 2001 13:41:13 GMT

Received: by estecmail1.estec.esa.nl(Lotus SMTP MTA v4.6.6 (890.1 7-16-1999)) id 412569F5.004B6ACB
; Fri, 16 Feb 2001 14:43:45 +0100
X-Lotus-FromDomain: ESA
To: sdurden@jpl.nasa.gov
cc: danders1@hq.nasa.gov
Message-Id: <412569F5.004B6959.00@estecmail1.estec.esa.nl>
Date: Fri, 16 Feb 2001 14:39:24 +0100
Subject: CloudSat and the radio-astronomers
Mime-Version: 1.0
Content-Disposition: inline
Content-Type: text/plain; charset=us-ascii
Content-Length: 872
Status: R

Dear Steve,

following our discussion in Ottawa regarding CloudSat and the radio
astronomers here is some info regarding the footnote I mentioned to you and
that mentions specifically the radioastronomers.

have a look at:

http://www.nfra.nl/craf/94g.htm

The home page is:

http://www.nfra.nl/craf/

and is the CRAF home page and contains quite a lot of interesting information

follow:

http://www.nfra.nl/craf/threats.htm

http://www.nfra.nl/craf/service.htm

http://www.nfra.nl/craf/ees.htm

Pedro

J. Pedro V. Poiares Baptista

Earth Sciences Division & D/TOS-EEP
ESTEC/ESA
Keplerlaan 1, NL-2200 AG Noordwijk, Netherlands

phone: +31-71-565-4319
fax: +31-71-565-5675
email: pedro.baptista@esa.int

Subject:
Re: Cloud Profiling Radar system
Date:
Wed, 06 Jun 2001 14:44:45 -0700
From:
steve durden <sdurden@jpl.nasa.gov>
To:
Darrel Emerson <demerson@nrao.edu>
References:
1

Hi Darrel,

Thanks for your note of introduction.

We do plan to look at our orbit relative to various mm-wave astronomy sites (provided by Klaus and Tom). This has been postponed for a while due to uncertainties in our orbit (we're formation flying with another platform whose orbit has some uncertainties). At this point I think we can do a preliminary analysis. I hope to complete this in the near future to know how often there might be a possibility of overflying a site.

Meanwhile, we're steadily working toward completing the radar instrument in late 2002. Launch is 2003 or possibly 2004.

Steve Durden

Darrel Emerson wrote:

> Dear Steve,
>
> I am in the process of taking over from Klaus Ruf as chair of IUCAF. Klaus has passed on to me some of the earlier correspondence about CloudSat. I understand, from your email to Klaus and Tom Gergely on Feb 27th, that there is an analysis in progress about the relationship between the proposed orbits and specified radio astronomy sites.
>
> I wonder what the current status of this study is, and of the CloudSat project in general?
>
> Thanks,
> regards,
> Darrel Emerson (NRAO Tucson).

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Stephen L. Durden
JPL 300-227
4800 Oak Grove Dr.
Pasadena, CA 91109 USA

(818)354-4719 (ph)
(818)393-5285 (fx)

sdurden@jpl.nasa.gov

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Deborah Vane
CloudSat Mission Deputy Principal Investigator
Jet Propulsion Laboratory
4800 Oak Grove Drive
Mail Stop 233-306
Pasadena, CA 91109
(tel) 818-354-3708
(fax) 818-393-9899

email: dvane@jpl.nasa.gov