In the United States Court of Federal Claims

No. 16-346C
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NOT FOR PUBLICATION

GEOSPATIAL TECHNOLOGY ASSOCIATES, LLC, Plaintiff, v. THE UNITED STATES, Defendant.	Patent Invalidity; Summary Judgment; RCFC 56; Novelty; Anticipation; Priority Date; 35 U.S.C. §102; 28 U.S.C. § 1498.

Richard T. Matthews, Counsel of Record, Williams Mullen, P.C., Raleigh, NC, for plaintiff.

Jenna Munnelly, Trial Attorney, *Gary L. Hausken*, Director, *Scott Stewart*, Deputy Assistant Attorney General, Commercial Litigation Branch, Civil Division, United States Department of Justice, Washington, DC, for defendant.

MEMORANDUM OPINION AND ORDER

GRIGGSBY, Judge

I. INTRODUCTION

In this patent and copyright infringement action, Geospatial Technology Associates, LLC ("GTA") alleges that the United States has infringed upon one or more of the claims of U.S. Patent No. 8,897,489 (the "'489 Patent") and upon GTA's registered copyright rights in certain software code (the "NINJA.pro Copyright"). *See generally* 4th Am. Compl. The government

[*] This Memorandum Opinion and Order was originally filed under seal on April 8, 2021. ECF No. 247. The parties were given an opportunity to advise the Court of their views with respect to what information, if any, should be redacted from the Memorandum Opinion and Order. On May 10, 2021, GTA filed a joint status report on behalf of the parties stating that the parties had no redactions to the Memorandum Opinion and Order. ECF No. 254. And so, the Court is reissuing its Memorandum Opinion and Order, dated April 8, 2021, as the public opinion.

has filed a brief on patent invalidity and the parties have filed cross-motions for summary judgment on the priority and conception dates for the '489 Patent and patent invalidity issues, pursuant to Rule 56 of the Rules of the United States Court of Federal Claims ("RCFC"). *See generally* Def. Br.; Pl. Resp. and MSJ; Def. MSJ. For the reasons set forth below, the Court **DENIES** GTA's motion for summary judgment and **GRANTS-IN-PART** the government's cross-motion for summary judgment.

II. FACTUAL AND PROCEDURAL BACKGROUND[1]

A. Factual Background

In this patent and copyright infringement action, GTA alleges that several government agencies, programs, platforms and sensors have used software algorithms and software code that utilize the claimed subject matter of the '489 Patent and infringe upon one or more claims of the '489 Patent. *See generally* 4th Am. Compl. GTA also alleges that these government agencies, programs, platforms and sensors infringe upon its NINJA.pro Copyright.[2] *Id.* As relief, GTA seeks to recover monetary damages from the government. *Id.* at Request for Relief.

1. The '489 Patent

As background, the '489 Patent patents technology involving automated image processing and target detection. *See generally* '489 Patent. This patent was filed on January 28, 2011, and GTA maintains that it relates back to provisional application No. 61/337,065, which was filed on January 29, 2010 (the "'065 Provisional Application"). *Id.*

[1] The facts recited in this Memorandum Opinion and Order are taken from the fourth amended complaint ("4th Am. Compl."); the '489 Patent; the government's brief on patent invalidity ("Def. Br."); GTA's response to the government's brief on patent invalidity and motion for summary judgment ("Pl. Resp. and MSJ") and the exhibits attached thereto ("Pl. Ex."); the government's reply in support of its patent invalidity brief ("Def. Reply Br."); the government's cross-motion for summary judgment ("Def. MSJ"); GTA's response and reply in support of its motion for summary judgment ("Pl. Reply"); and the government's reply in support of its cross-motion for summary judgment ("Def. Reply"). Except where otherwise noted, all facts recited herein are undisputed.

[2] The United States Copyright Office issued U.S. Copyright Registration No. TX 8-420-604, bearing an effective registration date of July 15, 2017, for work entitled "Methods for Object-Based Identification, Sorting and Ranking of Target Detection and Apparatuses Thereof." 4th Am. Compl. Ex. 2. William Basener is identified as the author of the computer program that is the subject of this copyright. *Id*. GTA is identified as the copyright claimant on the certificate of registration. *Id.*

The '065 Provisional Application is entitled "Methods for Object-Based Sorting and Ranking of Target Detections and Devices Thereof." Pl. Ex. C at 1. The '065 Provisional Application states, in relevant part, that:

> [T]his Object-Based Sorting and Ranking of Target Detections (OBSR) technology is a new method for sorting and ranking target detection scores in mulit [sic]-band spectral imagery. . . . The list of detections can contain metadata, such as time, latitude, longitude, nearby detected materials, and can be searched and cataloged as a database.
>
> Given a collection of one or more images, a statistical target detection filter is applied using one or more signatures from a library. The set of detection scores on pixels in a single image for a single target is called a detection plane. Each pixel is ranked by the number of standard deviations from the mean for the detection plane to give a statistical score for every pixel in the image collection. This score can be used to compare the strength of detections across images and targets.
>
> A second, spatial, process is applied to turn the per-pixel statistical scores into an object-based score. The highest scoring pixel in the image collection is identified (call it x) and a local region around this pixel is chosen. Endmembers . . . are chosen from this local region after the top statistical detection scores for the given target are masked out. The convex hull of these endmembers is a geometric model of the background for the detected pixel. The pixel is then "unmixed" by finding abundances . . . that give the best approximation of the pixel spectra as a linear combination of the background endmembers and the target . . . .

Id. at 3-4.

In November 2008, the inventor of the '489 Patent, Dr. William Basener, and his wife prepared an unsolicited draft proposal, entitled "Mathematically-Optimized Target Detection in Spectral Imagery" (the "Unsolicited Draft Proposal"). Def. Br. Ex. D at 1. The Unsolicited Draft Proposal states, in relevant part, that:

> We propose to conduct basic research into the mathematical foundations of target detection in hyper/mulit [sic]-spectral imaging to achieve two objectives:
>
> 1. Develop a Spectral Discrimination Prediction (SPD) [sic] algorithm, including software, that 1) can predict the relative performance of a given algorithm detecting a given spectra at multiple fill fractions in a given image, 2) predict the confuser materials for a given spectra in an image, and 3) predict the top performing detection algorithm for a given spectra and image.

> 2. Develop a suite of algorithms that use SDP to optimize target detection performance beyond the NGA 5 year goal.

Id. at 3.

On November 25, 2014, the United States Patent and Trademark Office ("USPTO") issued the '489 Patent to the Rochester Institute of Technology ("RIT"). *See generally* '489 Patent. Thereafter, RIT and GTA entered into an exclusive license agreement, whereby RIT transferred all substantial rights in the '489 Patent, including copyright rights in the NINJA.pro software, to GTA on November 12, 2015. 4th Am. Compl. at ¶¶ 20-23, 30.

The invention, as described in the '489 Patent abstract, is as follows:

> A method, non-transitory computer readable medium, and apparatus that provides object-based identification, sorting and ranking of target detections includes determining a target detection score for each pixel in each of one or more images for each of one or more targets. A region around one or more of the pixels with the determined detection scores which are higher than the determined detection scores for the remaining pixels in each of the one or more of images is identified. An object based score for each of the identified regions in each of the one or more images is determined. The one or more identified regions with the determined object based score for each region is provided.

'489 Patent at 1. Figure 2 of the '489 Patent provides an exemplary example of the method for target detection as shown below:

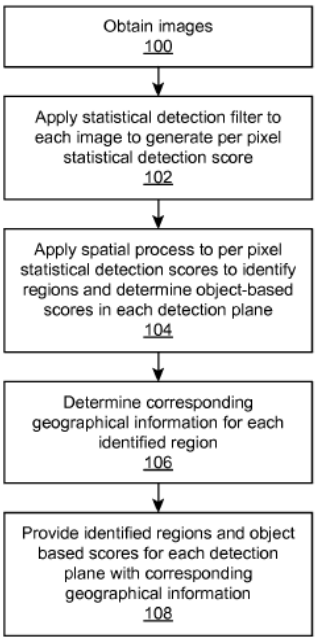

FIG. 2

Id. at 3.

The ‘489 Patent provides that the method for target detection involves five steps. *See id.* at 4:45-6:27. First, obtaining the images. *Id.* at 4:45-4:50. Second, applying a target detection algorithm to determine a target detection score for each pixel. *Id.* at 4:51-4:60. Third, determining an object-based score for identified regions from the determined target detection scores (although other types of scores for other identification aspects could be determined). *Id.* at 5:3-5:10. Fourth, obtaining geographic location information associated with each of the images at capture. *Id.* at 6:5-6:11. And, lastly, the fifth step involves providing one or more identified regions with the determined object-based score for each region. *Id.* at 6:16-6:27.

The ‘489 Patent also provides that each step of the process described above is performed using the exemplary example of the target detection processing apparatus contained in the ‘489 Patent as shown below:

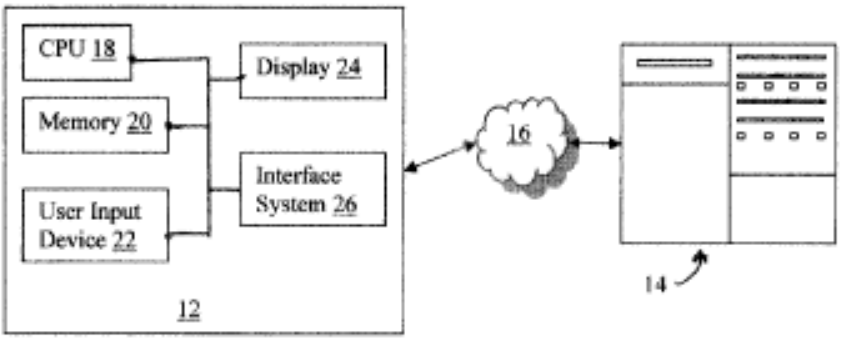

FIG. 1

Id. at 2.

2. Claims Of The '489 Patent

The '489 Patent consists of 33 claims, 30 of which are the subject of this action. *See generally* Pl. Claim Constr. Br.; *see also* 4th Am. Compl. at ¶ 157. Specifically, the '489 Patent consists of 12 independent claims and 21 dependent claims. *Id.* at 7. In this regard, Claims 2, 6, 7, 8, 9, 28 and 29 depend upon Claim 1; Claims 11, 15, 17, 18, 30 and 31 depend upon Claim 10; and Claims 20, 24, 25, 26, 27, 32 and 33 depend upon Claim 19. *See* '489 Patent at 6:58-13:9.

Claim 1 is the first independent claim, and this claim provides:

> A method for identification, sorting and ranking detections of one or more targets, the method comprising:
> determining with a target detection processing apparatus a target detection score for each pixel of a spectral image for one or more targets by obtaining with the target detection processing apparatus a signature for one or more of the targets for the image, and applying with the target detection processing apparatus the statistical target detection filter using the one or more obtained signatures to rank each of the pixels by its statistical score;
> identifying with the target detection processing apparatus a region around one or more of the pixels with the determined detection scores which are higher than a first score in said image;
> determining with the target detection processing apparatus an object-based spectral identification score for each of the identified regions in said image; and
> providing with the target detection processing apparatus the one or more identified regions with the determined object-based score for each region.

'489 Patent at 6:57-7:10.

Claim 3 is the second independent claim, and this claim provides:

A method for identification, sorting and ranking detections of one or more targets, the method comprising:
determining with a target detection processing apparatus a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying with the target detection processing apparatus a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining with the target detection processing apparatus an object-based score for each of the identified regions in each of the one or more images; and
providing with the target detection processing apparatus the one or more identified regions with the determined object-based score for each region, wherein the determining a target detection score further comprises:
obtaining with the target detection processing apparatus a signature for one or more of the targets for each of the one or more images; and
applying with the target detection processing apparatus the statistical target detection filter using the one or more obtained signatures to rank each of the pixels by a number of standard deviations from a mean for each of the one or more images to determine the statistical deviation score.

Id. at 7:19-7:43.

Claim 4 is the third independent claim, and this claim provides:

A method for identification, sorting and ranking detections of one or more targets, the method comprising:
determining with a target detection processing apparatus a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying with the target detection processing apparatus a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining with the target detection processing apparatus an object-based score for each of the identified regions in each of the one or more images; and
providing with the target detection processing apparatus the one or more identified regions with the determined object-based score for each region, wherein the identifying further comprises:
masking out from each of the regions with the target detection processing apparatus the one or more of the pixels in each of the one or more images which have the highest determined statistical detection scores in each of the one or more images;
selecting with the target detection processing apparatus one or of the pixels which are end members for each of the regions; and
identifying with the target detection processing apparatus a convex hull of the selected end members as a boundary for the one or more regions for each of the one or more of images.

Id. at 7:44-8:4.

Claim 5 is the fourth independent claim, and this claim provides:

> A method for identification, sorting and ranking detections of one or more targets, the method comprising:
> determining with a target detection processing apparatus a target detection score for each pixel in each of one or more images for each of one or more targets;
> identifying with the target detection processing apparatus a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
> determining with the target detection processing apparatus an object-based score for each of the identified regions in each of the one or more images; and
> providing with the target detection processing apparatus the one or more identified regions with the determined object-based score for each region, wherein the determining the object based score further comprises:
> unmixing with the target detection processing apparatus the pixel with highest determined statistical detection score in each of the identified regions by finding one or more abundances to determine pixel spectra; and
> comparing with the target detection processing apparatus target spectra for each of the one or more targets with the determined pixel spectra to determine the object based score for each of the identified regions.

Id. at 8:5-8:29.

Claim 10 is the fifth independent claim, and this claim provides:

> A non-transitory computer readable medium having stored thereon instructions for identification, sorting and ranking detections of one or more targets comprising machine executable code which when executed by at least one processor, causes the processor to perform steps comprising:
> determining a target detection score for each pixel in a spectral image for each of one or more targets by obtaining a signature for one or more of the targets for the image, and applying the statistical target detection filter using the one or more obtained signatures to rank each of the pixels by its statistical score;
> identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in said image;
> determining an object-based spectral identification score for each of the identified regions in said image; and
> providing the one or more identified regions with the determined object-based spectral identification score for each region.

Id. at 8:46-8:64.

Claim 12 is the sixth independent claim, and this claim provides:

> A non-transitory computer readable medium having stored thereon instructions for identification, sorting and ranking detections of one or more targets comprising

machine executable code which when executed by at least one processor, causes the processor to perform steps comprising:
determining a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining an object-based score for each of the identified regions in each of the one or more images; and
providing the one or more identified regions with the determined object-based score for each region, wherein the determining a target detection score further comprises:
obtaining a signature for one or more of the targets for each of the one or more images; and
applying the statistical target detection filter using the one or more obtained signatures to rank each of the pixels by a number of standard deviations from a mean for each of the one or more images to determine the statistical deviation score.

Id. at 9:3-9:24.

Claim 13 is the seventh independent claim, and this claim provides:

A non-transitory computer readable medium having stored thereon instructions for identification, sorting and ranking detections of one or more targets comprising machine executable code which when executed by at least one processor, causes the processor to perform steps comprising:
determining a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining an object-based score for each of the identified regions in each of the one or more images; and
providing the one or more identified regions with the determined object-based score for each region, wherein the identifying further comprises:
masking out from each of the regions the one or more of the pixels in each of the one or more images which have the highest determined statistical detection scores in each of the one or more images;
selecting one or of the pixels which are end members for each of the regions; and
identifying a convex hull of the selected end members as a boundary for the one or more regions for each of the one or more of images.

Id. at 9:25-9:48.

Claim 14 is the eighth independent claim, and this claim provides:

A non-transitory computer readable medium having stored thereon instructions for identification, sorting and ranking detections of one or more targets comprising

machine executable code which when executed by at least one processor, causes the processor to perform steps comprising:
determining a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining an object-based score for each of the identified regions in each of the one or more images; and
providing the one or more identified regions with the determined object-based score for each region, wherein the determining the object based score further comprises:
unmixing the pixel with highest determined statistical detection score in each of the identified regions by finding one or more abundances to determine pixel spectra; and
comparing target spectra for each of the one or more targets with the determined pixel spectra to determine the object based score for each of the identified regions.

Id. at 9:49-10:3.

Claim 19 is the ninth independent claim, and this claim provides:

A target detection processing apparatus comprising:
one or more processors;
a memory coupled to the one or more processors which are configured to execute programmed instructions stored in the memory comprising:
determining a target detection score for each pixel in a spectral image for each of one or more targets by obtaining a signature for one or more of the targets for the image, and applying the statistical target detection filter using the one or more obtained signatures to rank each of the pixels by its statistical score;
identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in said image;
determining an object-based spectral identification score for each of the identified regions in said image; and
providing the one or more identified regions with the determined object-based spectral identification score for each region.

Id. at 10:18-10:37.

Claim 21 is the tenth independent claim, and this claim provides:

A target detection processing apparatus comprising:
one or more processors;
a memory coupled to the one or more processors which are configured to execute programmed instructions stored in the memory comprising:
determining a target detection score for each pixel in each of one or more images for each of one or more targets;

identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining an object-based score for each of the identified regions in each of the one or more images; and
providing the one or more identified regions with the determined object-based score for each region, wherein the one or more processors is further configured to execute programmed instructions stored in the memory for the determining a target detection score further comprising:
obtaining a signature for one or more of the targets for each of the one or more images; and
applying the statistical target detection filter using the one or more obtained signatures to rank each of the pixels by a number of standard deviations from a mean for each of the one or more images to determine the statistical deviation score.

Id. at 10:45-11:3.

Claim 22 is the eleventh independent claim, and this claim provides:

A target detection processing apparatus comprising:
one or more processors;
a memory coupled to the one or more processors which are configured to execute programmed instructions stored in the memory comprising:
determining a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining an object-based score for each of the identified regions in each of the one or more images; and
providing the one or more identified regions with the determined object-based score for each region, wherein the one or more processors is further configured to execute programmed instructions stored in the memory for the identifying further comprising:
masking out from each of the regions the one or more of the pixels in each of the one or more images which have the highest determined statistical detection scores in each of the one or more images;
selecting one or of the pixels which are end members for each of the regions; and
identifying a convex hull of the selected end members as a boundary for the one or more regions for each of the one or more of images.

Id. at 11:4-11:31.

Lastly, Claim 23 is the twelfth independent claim, and this claim provides:

A target detection processing apparatus comprising:
one or more processors;

a memory coupled to the one or more processors which are configured to execute programmed instructions stored in the memory comprising;
determining a target detection score for each pixel in each of one or more images for each of one or more targets;
identifying a region around one or more of the pixels with the determined detection scores which are higher than a first score in each of the one or more of images;
determining an object-based score for each of the identified regions in each of the one or more images; and
providing the one or more identified regions with the determined object-based score for each region, wherein the one or more processors is further configured to execute programmed instructions stored in the memory for the determining the object based score further comprising:
unmixing the pixel with highest determined statistical detection score in each of the identified regions by finding one or more abundances to determine pixel spectra; and
comparing target spectra for each of the one or more targets with the determined pixel spectra to determine the object based score for each of the identified regions.

Id. at 11:32-11:57.

3. The Court's Construction Of The Terms "Object-Based Spectral Identification Score" And "Object-Based Score"

On March 7, 2019, the Court issued a Memorandum Opinion and Order on Claim Construction that defined, among other things, the claim term or phrase "object-based spectral identification score," found in Claims 1, 10 and 19, and the claim term or phrase "object-based score," found in Claims 3, 4, 5, 12, 13, 14, 21, 22 and 23. *See* Mar. 7, 2019, Claim Constr. Mem. Op. and Order at 32. The Court construed these terms to mean "any metric that is computed from the pixels in an identified region using a process that provides better understanding of the material or object in the region." *Id.*

4. The ARCHER System

Also relevant to the parties' cross-motions for summary judgment on patent invalidity issues is the ARCHER system. The Civil Air Patrol ARCHER Hyperspectral Sensor System (the "ARCHER system") is an airborne real-time cueing hyperspectral enhanced reconnaissance system procured by the Air Force to increase its search and rescue mission capability. *See* Def. Br. Ex. I at US_003214; *see also* B. Stevenson et al., *The Civil Air Patrol ARCHER Hyperspectral Sensor System*, 5787 Proc. SPIE 17 (2005). The ARCHER system incorporates an onboard data processing system to perform numerous real-time processing functions,

including "data acquisition and recording, raw data correction, target detection, cueing and chipping, precision image geo-registration, and display and dissemination of image products and target cue information." *Id.* In addition, the ARCHER system contains, among other things, an advanced hyperspectral imaging system and high-resolution camera. *Id.* at US_003216. The system also contains an on-board real-time processor for data calibration, geo-rectification, target detection, display and recording. *Id.* Figure 1 below shows the ARCHER system's imaging geometry.

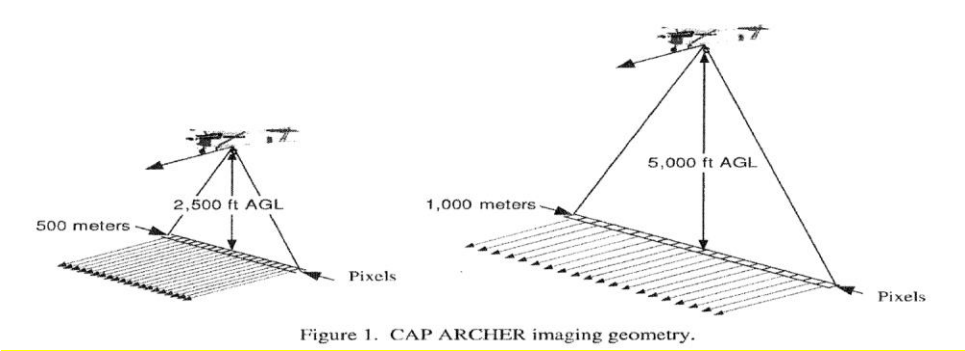

Figure 1. CAP ARCHER imaging geometry.

Id. at US_003217.

The Civil Air Patrol ARCHER Hyperspectral Sensor System reference states that "[u]pon detection of a possible ground target by one of the ARCHER spectral algorithms, the processor extracts a subregion of image data surrounding that point from each sensor." *Id.* at US_003220. The reference also states that:

> Each of these images is geo-registered and cropped to create a 256 x 256 pixel chip of the target area. Finally, the two chips are precisely aligned via a scene-based correlation shift measurement, and then fused, by combining the three-color information of the HSI chip with the higher spatial resolution of the HRI. All three chips—HSI, HRI and Fused—are sent to the Chip Viewer window (Figure 4) for operator review. The fused chip is also overlaid onto the GeoPaint window at the exact location of the detected target . . . .

Id. The Air Force developed the ARCHER system in 2004 and deployed the system in 2005. Def. Br. Ex. A at ¶ 54.

5. The Stocker And Jones Reports

Both parties have retained experts who have provided expert reports on the priority date for the '489 Patent and whether the claims of the '489 Patent are invalid for lack of novelty,

obviousness, or indefiniteness. *See generally* Def. Br. Ex. A ("Stocker Report"); Def. Br. Ex. B ("Jones Report").

The government's expert, Alan Stocker, opines in his report that: (1) the priority date for the '489 Patent is January 28, 2011, the date on which the application that resulted in the patent was filed, and (2) the claims of the '489 Patent are not novel, are obvious in light of prior art and are indefinite. *See generally* Stocker Report.

Specifically, with regards to the priority date for the '489 Patent, Mr. Stocker opines that GTA cannot rely upon the filing date for the '065 Provisional Application to establish the priority date for the '489 Patent, because the '894 Application, which resulted in the '489 Patent filed on January 28, 2011, is "substantially different from the '065 Provisional Application and contains descriptive material and claims not included in the '065 Provisional Application." Stocker Report at ¶¶ 31-32. In this regard, Mr. Stocker opines that the difference in the titles of the two documents and the addition of the term "identification" to the '894 Application title—as well as the references to "identification scores" and "advanced material identification" in the text of the '894 Application—"provide strong evidence that the two filings do not describe the same invention." *Id.* at ¶ 33 (noting that the '065 Provisional Application is titled "Methods for Object-Based Sorting and Ranking of Target Detections and Devices Thereof," whereas the '894 Application is titled "Methods for Object-Based Identification, Ranking and Sorting of Target Detections and Apparatuses Thereof"). And so, Mr. Stocker opines that the priority date for the '489 Patent is January 28, 2011, when the '894 Application was filed. *Id.* at ¶ 41.

With regards to the issue of patent invalidity, Mr. Stocker observes in his report that:

> The '489 Patent pertains to automated methods and means for detecting and identifying desired targets or materials with known signatures in digitized spectral imagery. The overall process is set out in Fig. 2 of the '489 Patent and the corresponding steps outlined in the Claim Construction Memorandum Opinion and Order, the processing approach consists of the following five top-level elements:
>
> - Obtain Images
> - Apply Statistical Detection Filtering
> - Identify Regions and Determine Object-Based Scores
> - Determine Geographical Information for Identified Regions
> - Provide Identified Regions and Object Scores with Geographical Information

Id. at ¶ 42. Mr. Stocker also opines that the claims of the '489 Patent:

> [D]isclose steps encompassing these five major elements across three categories: 1) a "method" (i.e. an algorithm), Claims 1 through 9, 28 and 29; 2) a "computer-readable medium having stored thereon instructions" (i.e. computer code implementing the algorithm), Claims 10 through 18, 30 and 31; and 3) an "apparatus" (i.e. processor hardware implementing the algorithm), 19 through 27, 32 and 33.

Id. at ¶ 43. And so, Mr. Stocker concludes that each of the aforementioned steps contained in the '489 Patent was previously known in the art. *Id.* at ¶ 44.

In this regard, Mr. Stocker states that "[n]umerous hyperspectral sensor systems predating January 28, 2011 had built-in capabilities for acquiring image data for purposes of recording, correction and calibration, and higher-level processing functions including target detection," including COMPASS, WARHORSE and ARCHER. *Id.* at ¶ 46. He also states that "[a]n early demonstration of real-time detection filtering in an operational hyperspectral imaging application was the ARCHER system developed for the Civil Air Patrol in 2004 and deployed the following year." *Id.* at ¶ 54.

Mr. Stocker also states that:

> Claim 8 refers to a method for providing geographical information for identified regions in hyperspectral imagery. Geolocation of images and subregions within images was by no means a novel method or capability to a Person of Ordinary Skill in the Art [("POSITA")] prior to January 28, 2011. To cite a typical example, the Civil Air Patrol ARCHER system deployed in 2005 utilized platform inertial measurement unit (IMU) data along with a sensor model to calculate accurate geolocations for targets detected in its hyperspectral imagery.

Id. at ¶ 62. Lastly, Mr. Stocker states that:

> Claims 8, 9 and 18 call for "providing" the detected and identified regions with their associated object scores and geolocation information. Reporting georeferenced target detection and/or identification results to a user, operator or analyst was a built-in function of several hyperspectral processing tools and processor systems that existed prior to January 28, 2011.

Id. at ¶ 63. And so, he concludes that "[v]arious sensor systems which were developed and operating before the priority date, including CAP ARCHER, HyCAS and ACES Hy, utilized one

or more of these methods to provide hyperspectral object cues with associated scores and locations to operators and analysts. *Id.*

With regards to determining an object-based spectral identification score, Mr. Stocker opines that "[o]bject-based scoring, as described in Claim 1, is a process of comparing determined (i.e. background-subtracted) pixel spectra with hypothesized target signatures to compute and rank object-based identification scores associated with each of those signatures for every object [region of interest] considered." *Id.* at ¶ 74. With regard to the limitation found in the claims of the '489 Patent regarding providing the one or more regions with the determined object-based score, Mr. Stocker also opines that "[t]his step of Claim 1 merely provides (i.e. reports) the previously determined object-based identification scores associated with each of those signatures for every object [region of interest]." *Id.* at ¶ 76. And so, Mr. Stocker opines that Claim 1 of the '489 Patent is anticipated by the ARCHER system. *Id.* at ¶ 77.

In this regard, he observes that:

> [T]he ARCHER system performed numerous real-time processing functions including data acquisition and recording, raw data correction, target detection, cueing and chipping, precision image geo-registration, and display and dissemination of image products and target cue information.
>
> The ARCHER system operator was able to select desired signatures from an on-board library to initiate adaptive matched filters that automatically cued probable target objects, produced resolution-enhanced image chips centered on those object cues, and provided tabulated information about the cues including normalized detector scores and geolocations. Although not explicitly noted in the reference, I know from experience that the cued objects could be easily ranked by their respective detector scores simply by clicking on the displayed column header for those scores (similar to the way one sorts entries in a spreadsheet column). . . .
>
> ARCHER also defined local image regions surrounding pixels or contiguous clusters of pixels that exceeded a detection threshold. These regions were referred to as "chips" and were automatically resolution-enhanced, recorded and displayed in color to the sensor operator to indicate the location of a detected object and its local scene context. By generating these detection-cued regions, ARCHER anticipated the use of methods for detailed post-detection analysis of detected objects based on spatial and spectral information, including but not limited to target identification based on spectral signatures.

Id. at ¶¶ 77-79.

Mr. Stocker also opines that Claims 2, 4, 5, 6, 7, 8, 9, 28 and 29 of the '489 Patent are not novel and are also anticipated by the ARCHER system. *Id.* at ¶¶ 81-98. With regards to Claims 2 and 4, he opines that ARCHER and another system, ACES Hy, anticipate the statistical target detection filter application step in Claim 2. *Id.* at ¶¶ 82, 86. With regards to Claim 5, Mr. Stocker also opines that the ARCHER and ACES Hy systems performed detected target region generation via their built-in "chipping" functions, and he observes that:

> [U]nmixing was a conventional practice and would be well-known to the [POSITA]. And . . . the ARCHER and ACES Hy systems anticipated further exploitation of identified regions associated with detected targets by incorporating automatic 'chipping' functions.

Id. at ¶ 87.

Mr. Stocker further opines regarding Claims 6 and 7 that "the methods of obtaining images were widely known," prior to January 28, 2011, "the ARCHER and ACES Hy systems performed this step" and, with regards to Claim 8, the "additional step of providing geographical information for target regions in spectral images was routine in the art by January 28, 2011, as evidenced by the fact that the ARCHER and ACES Hy systems performed this function automatically." *Id.* at ¶¶ 89, 92. Lastly, with regards to Claims 28 and 29, Mr. Stocker opines that the process described in Claim 28 "was a conventional practice and would be well-known to [POSITAs] before January 28, 2011" and that "unmixing was a conventional practice and would be well-known to the [POSITA] before January 28, 2011." *Id.* at ¶¶ 96, 98.

Mr. Stocker also opines that the '489 Patent is invalid due to obviousness. In this regard, Mr. Stocker opines that the methods described in the claims of the '489 Patent were obvious in the context of prior art in the field of hyperspectral image exploitation. *Id.* at ¶ 99. Specifically, with regards to Claim 1, Mr. Stocker states that the use of multiple statistical matched filters to detect target signals with unknown parameters or signatures "is a well-known technique with a long history of applications to a variety of sensor systems." *Id.* at ¶ 101.

Lastly, with regards to indefiniteness, Mr. Stocker opines, among other things, that the claims of the '489 Patent are indefinite with regards to the claim limitations: (1) "identify regions and determine object-based scores;" (2) "determine geographic information for identified regions;" and (3) "provide identified regions and object scores with geographical information." *Id.* at ¶¶ 134-142. Specifically, Mr. Stocker opines that, Claims 4, 5 and 29 of the '489 Patent

"describe a generic spectral unmixing process in which endmembers are determined from one or more selected pixels in each identified region to define a convex hull (i.e. simplex), and subsequently used to calculate abundances (i.e. fractional weights) for the endmembers to model detected pixel spectra." *Id.* at ¶ 134. But, he observes that "it is not stated how the endmembers are to be determined, which is itself a major issue in the literature on spectral unmixing." *Id.* at ¶ 135. Mr. Stocker also opines that "[t]he process by which the endmember abundance weights for pixel spectra are to be calculated is also not described in the claims of the '489 Patent." *Id.* at ¶ 136. And so, Mr. Stocker opines that "[s]ince critical details are missing from the teachings of Claims 4, 5 and 29 of the '489 Patent, a [POSITA] could not be reasonably certain of their applicability." *Id.* at ¶ 137.

GTA's expert, Dr. Creed F. Jones III, disagrees with Mr. Stocker's opinions about the priority and conception dates and the validity of the '489 Patent and he opines in his report that: (1) the priority date for the '489 Patent is January 29, 2010, when the '065 Provisional Application was filed; (2) the conception date of the '489 Patent is at least as early as November 22, 2008; and (3) the '489 Patent is not invalid due to lack of novelty, obviousness, or indefiniteness. *See generally* Jones Report.

With regards to the priority date for the '489 Patent, Dr. Jones opines that a POSITA would conclude that the inventor of the '489 Patent had possession of the claimed invention at the time the '065 Provisional Application was filed. *Id.* at ¶ 137. In this regard, Dr. Jones observes that the '065 Provisional Application "includes screen shots and output from an actual working embodiment of the invention claimed in the '489 Patent."[3] *Id.*

Dr. Jones also opines that the conception date of the '489 Patent is "at least as early as November 22, 2008," the date of the last modification of the Unsolicited Draft Proposal. *Id.* at ¶

[3] Dr. Jones further observes that paragraphs [0006]-[0008] of the '065 Provisional Application "teach the same background removal and error (or spectral fit) object-based identification method and formulas as set forth in column 5 of the '489 Patent" and that pages 28-34 of the '065 Provisional Application show "NINJA output that ranks multiple identified targets and provides error estimates, real detections, and possible confusers for each target." Def. Br. Ex B at ¶¶ 143, 146. And so, Dr. Jones opines that a POSITA would recognize that Dr. Basener had possession of an identification algorithm as of the filing date of the Provisional Application, making the priority date for the '489 Patent being January 29, 2010, the filing date of the '065 Provisional Application. *Id.* at ¶¶ 137, 142.

149. And so, Dr. Jones concludes that a POSITA would understand that Dr. Basener had conceived his invention at least as early as November 22, 2008. *Id.* at ¶ 153.

With regards to the issue of patent invalidity, Dr. Jones first opines that the government has not established that the ARCHER system anticipates the claims of the '489 Patent for the following five reasons: (1) Mr. Stocker does not identify the specific version of the ARCHER system that he relies upon as prior art, nor the date on which that version was first publicly used; (2) Mr. Stocker's description of the ARCHER system relies almost entirely upon his own subjective memory of the ARCHER system, not a single prior art reference or system; (3) Mr. Stocker improperly combines the disclosures of the Civil Air Patrol ARCHER Hyperspectral Sensor System reference and an unspecified version or versions of the ARCHER system with his own, non-public, subjective knowledge of the ARCHER system; (4) Mr. Stocker does not identify where in any prior art reference each claim limitation is found; and (5) the only specific citation that Mr. Stocker provides for any of these references demonstrates that the ARCHER system did not explicitly or inherently disclose ranking or target identification. *Id.* at ¶¶ 248-252. Specifically relevant to the parties' cross-motions for summary judgment, Dr. Jones opines that the ARCHER system is "missing two limitations of Claim 1 [of the '489 Patent,] and thus cannot anticipate that claim." *Id.* at ¶ 252 (emphasis omitted). And so, Dr. Jones opines that "a [POSITA] would not understand that ranking of target detections was 'necessarily present' in [the ARCHER system]." *Id.*

With regards to obviousness, Dr. Jones also opines that Mr. Stocker has not shown that the claims of the '489 Patent are obvious, because Mr. Stocker fails to demonstrate that: (1) prior art references or prior public uses disclosed or taught each and every limitation of Claim 1, and (2) it would have been obvious for a POSITA to combine the teachings as is required to demonstrate that a combination of references or uses renders a claim obvious. *Id.* at ¶ 294. Lastly, with regards to indefiniteness, Dr. Jones opines that the claims of the '489 Patent are not indefinite, because they are not means-plus-function terms, and, even if the claims could be considered to be means-plus-function terms, "the specification would disclose adequate corresponding structure." *Id.* at ¶ 476.

B. Relevant Procedural Background

On July 24, 2020, the government filed a brief on patent invalidity. *See generally* Def.

Br. On August 7, 2020, GTA filed a response to the government's brief on patent invalidity and a motion for summary judgment on the issues of the conception and priority dates for the '489 Patent and patent invalidity. *See generally* Pl. Resp. and MSJ. On August 21, 2020, the government filed a reply in support of its brief on patent invalidity. *See generally* Def. Reply Br.

On September 4, 2020, the government filed a response and opposition to GTA's motion for summary judgment and a cross-motion for summary judgment on the issues of the conception and priority dates for the '489 Patent and patent invalidity. *See generally* Def. MSJ. On October 2, 2020, GTA filed a reply in support of its motion for summary judgment and a response and opposition to the government's cross-motion for summary judgment. *See generally* Pl. Reply. On October 9, 2020, the government filed a reply in support of its cross-motion for summary judgment. *See generally* Def. Reply.

The Court held oral arguments on the parties' cross-motions for summary judgment on March 24, 2021. *See generally* Tr.

The parties' cross-motions for summary judgment having been fully briefed, the Court resolves the pending motions.

III. LEGAL STANDARDS

A. Patent Infringement Claims Against The Government

Title 28, United States Code, section 1498(a) waives the government's sovereign immunity and provides a remedy "[w]henever an invention described in and covered by a patent of the United States is used or manufactured by or for the United States without license of the owner thereof or lawful right to use or manufacture the same." 28 U.S.C. § 1498(a); *see also Astornet Techs. Inc. v. BAE Sys., Inc.*, 802 F.3d 1271, 1277 (Fed. Cir. 2015). In this regard, Section 1498(a) provides that:

> [T]he owner's remedy shall be by action against the United States in the United States Court of Federal Claims for the recovery of his reasonable and entire compensation for such use and manufacture.

Id.

B. RCFC 56

Pursuant to RCFC 56, a party is entitled to summary judgment when there is "no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." RCFC 56(a); *see Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-48 (1986); *Biery v. United States*, 753 F.3d 1279, 1286 (Fed. Cir. 2014). A dispute is "genuine" when "the evidence is such that a reasonable jury could return a verdict for the nonmoving party." *Anderson*, 477 U.S. at 248. A fact is "material" if it could "affect the outcome of the suit under the governing law." *Id.*

The moving party bears the burden of demonstrating the absence of any genuine issues of material fact. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). And so, '"the inferences to be drawn from the underlying facts . . . must be viewed in the light most favorable to the party opposing the motion."' *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 587-88 (1986) (quoting *United States v. Diebold, Inc.*, 369 U.S. 654, 655 (1962)).

In making a summary judgment determination, the Court does not weigh the evidence presented, but instead must "determine whether there is a genuine issue for trial." *Anderson*, 477 U.S. at 249; *see also Am. Ins. Co. v. United States*, 62 Fed. Cl. 151, 154 (2004); *Agosto v. INS*, 436 U.S. 748, 756 (1978) ("[A trial] court generally cannot grant summary judgment based on its assessment of the credibility of the evidence presented . . . .") (citations omitted). Given this, the Court may grant summary judgment when "the record taken as a whole could not lead a rational trier of fact to find for the nonmoving party." *Matsushita*, 475 U.S. at 587.

The above standard applies when the Court considers cross-motions for summary judgment. *Principal Life Ins. Co. & Subs. v. United States*, 116 Fed. Cl. 82, 89 (2014); *see also Estate of Hevia v. Portrio Corp.*, 602 F.3d 34, 40 (1st Cir. 2010). And so, when both parties move for summary judgment, '"the court must evaluate each party's motion on its own merits, taking care in each instance to draw all reasonable inferences against the party whose motion is under consideration."' *Abbey v. United States*, 99 Fed. Cl. 430, 436 (2011) (quoting *Mingus Constructors, Inc. v. United States*, 812 F.2d 1387, 1391 (Fed. Cir. 1987)).

C. Patent Invalidity And Section 102

An invalid patent cannot be infringed. *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1931 (2015) (Scalia, J., dissenting on other grounds) (recognizing the cardinal maxim that "[i]t follows, as night the day, that only valid patents can be infringed. To talk of infringing an invalid patent is to talk nonsense."). And so, the Court need not reach the issue of patent

infringement if the claims of the patent are found to be invalid, based upon clear and convincing evidence. *See, e.g.*, *Del Mar Eng'g Lab'ys v. United States*, 524 F.2d 1178, 1186 (Ct. Cl. 1975) ("[i]n view of the conclusion on validity, it is unnecessary to reach the question of infringement, for an invalid patent cannot be infringed.") (internal citation omitted); *Sparton Corp. v. United States*, 89 Fed. Cl. 196, 242 (2009) (declining to decide infringement after finding two patents invalid for obviousness, and thus holding that the plaintiff "no longer has a claim under 28 U.S.C. § 1498").[4]

An issued patent is presumed valid—novel, nonobvious, useful, and containing patentable subject matter—because the "[US]PTO [is] presumed to do its job." *Microsoft Corp. v. I4I Ltd. P'ship*, 564 U.S. 91, 97 (2011) (citation omitted); 35 U.S.C. § 282. To rebut this presumption, an accused infringer must prove its affirmative defense of invalidity by clear and convincing evidence. *Takeda Chem. Indus., Ltd. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1355 (Fed. Cir. 2007); *Norian Corp. v. Stryker Corp.*, 363 F.3d 1321, 1326 (Fed. Cir. 2004); *see also Newell Cos., Inc. v. Kenney Mfg. Co.*, 864 F.2d 757, 767 (Fed. Cir. 1988). In this regard, the Federal Circuit has held that a person cannot obtain a patent unless the invention is new. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 780 (Fed. Cir. 1985) ("[t]he patent law imposes certain fundamental conditions for patentability, paramount among them being the condition that what is sought to be patented, as determined by the claims, be new."). The pre-AIA version of Section 102 provides, in relevant part, that:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States[.]

35 U.S.C. § 102(a)-(b) (2006). And so, a patent claim is invalid for a lack of novelty, or anticipation, under 35 U.S.C. § 102, if each and every element set forth in the claim is found,

[4] The pre-America Invents Act versions of 35 U.S.C. § 102 is applicable to this case.

either expressly or inherently, in a single reference. *Atlas Powder Co. v. Ireco, Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999).

Although anticipation normally requires that a prior art reference disclose each and every limitation of a claim, the Federal Circuit has recognized that "a prior art reference may anticipate when the claim limitation or limitations not expressly found in that reference are nonetheless inherent in it." *Id.* at 1347. Given this, "[u]nder the principles of inherency, if the prior art necessarily functions in accordance with, or includes, the claimed limitations, it anticipates." *Id.* And so, "if granting patent protection on the disputed claim would allow the patentee to exclude the public from practicing the prior art, then that claim is anticipated, regardless of whether it also covers subject matter not in the prior art." *Id.* at 1346 (citing *Titanium Metals Corp.*, 778 F.2d at 781).

D. Patent Priority Date

Lastly, to ascertain the effective filing date for a patent, the Court must determine a patent's priority with respect to earlier patent applications. 35 U.S.C. § 120 (2006). Generally, the effective filing date of a patent is presumed to be the filing date apparent on the face of the patent, unless the patent examiner found otherwise during prosecution. *See PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1305-06 (Fed. Cir. 2008). But, a patent owner can rebut this presumption by "com[ing] forward with evidence to prove entitlement to claim priority to an earlier filing date," such that the patent-in-suit should be deemed as filed on the filing date of its earlier related patents. *Id.*; *see also Cordance Corp. v. Amazon.com, Inc.*, 658 F.3d 1330, 1334 (Fed. Cir. 2011).

"[T]he test for conception is whether the inventor had an idea that was definite and permanent enough that one skilled in the art could understand the invention." *Burroughs Wellcome Co. v. Barr Lab'ys, Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994). The Federal Circuit has defined a "definite and permanent" idea as an idea that is a "specific, settled idea, a particular solution to the problem at hand, not just a general goal or research plan." *Id.*; *see also Coleman v. Dines*, 754 F.2d 353, 359 (Fed. Cir. 1985) ("[i]t is settled that in establishing conception a party must show possession of every feature recited in the count, and that every limitation of the count must have been known to the inventor at the time of the alleged conception.") (citation omitted).

IV. LEGAL ANALYSIS

The government has filed a brief on patent invalidity and the parties have filed cross-motions for summary judgment on the priority and conception dates for the '489 Patent and several issues related to the validity of the '489 Patent. Specifically, the parties present the following issues for resolution by the Court: (1) whether GTA has established a conception date for the invention claimed in the '489 Patent of November 22, 2008; (2) whether GTA has established a priority date of January 29, 2010, for the invention claimed in the '489 Patent; (3) whether the claims of the '489 Patent are anticipated by the ARCHER system; (4) whether the '489 Patent is invalid due to obviousness; and (5) whether the '489 Patent is invalid due to indefiniteness. *See generally* Def. Br.; Def. MSJ; Pl. Resp. and MSJ; 35 U.S.C. §§ 102, 103 and 112.

In its motion for summary judgment, GTA argues that the priority date for the '489 Patent is January 29, 2010, because a POSITA would conclude that the inventor of the '489 Patent had possession of the claimed invention at the time that the '065 Provisional Application was filed. Pl. Resp. and MSJ at 38-41; *see also* Jones Report at ¶ 137. GTA also contends that the conception date for the invention at issue is November 22, 2008, because a POSITA would understand that Dr. Basener had conceived of the invention claimed in the '489 Patent by that date. Pl. Resp. and MSJ at 34-38; *see also* Jones Report at ¶ 153.

The government counters that the priority date for the '489 Patent is the date on which the application that resulted in the patent was filed—January 28, 2011. Def. MSJ at 2-3; *see also* Stocker Report at ¶ 41. And so, the government argues that the Court should deny GTA's motion for summary judgment on these threshold issues. Def. MSJ at 3.

The government also presents three invalidity defenses in its cross-motion for summary judgment. First, the government argues that the '489 Patent is invalid for a lack of novelty, because the undisputed material facts in this case show that each claim of the patent was anticipated by the ARCHER system. Def. MSJ at 3-4; *see also* Def. Br. at 12-13. Second, the government argues that the '489 Patent is invalid for obviousness, because the methods described in the claims of the '489 Patent were obvious within the context of prior art in the field of hyperspectral image exploitation. Def. MSJ at 4-7; *see also* Def. Br. at 13-21. Lastly, the government contends that the '489 Patent is also invalid for indefiniteness, because the claims of

the patent cover both apparatus and method of using the apparatus. Def. MSJ at 7-9; *see also* Def. Br. at 21-27. And so, the government requests that the Court grant its cross-motion for summary judgment on patent invalidity issues. Def. MSJ at 9.

GTA counters that the government has not shown that the '489 Patent is invalid for a lack of novelty, non-obviousness, or indefiniteness. Specifically, GTA argues that the government neither relies upon a single prior art reference, nor shows that the ARCHER system discloses an "object-based score," to establish by clear and convincing evidence that the claims of the patent were anticipated. Pl. Resp. and MSJ at 12-18. GTA also argues that the government has not provided evidence of key elements of its obviousness defense, including evidence of a motivation to combine prior art. *Id.* at 18-26. Lastly, GTA argues that the government has not shown that the claims of the '489 Patent are indefinite, because, among other things, no claims of the '489 Patent cover both method and apparatus. *Id.* at 26-34. And so, GTA requests that the Court deny the government's cross-motion for summary judgment on these patent invalidity issues. Pl. Reply at 8.

For the reasons discussed below, the undisputed material facts show that GTA has not established a conception date of November 22, 2008, or a priority date of January 29, 2010, for the '489 Patent. In addition, the undisputed material facts show that the '489 Patent is invalid due to a lack of novelty, because the government has shown by clear and convincing evidence that the ARCHER system anticipates each and every claim of the '489 Patent. And so, the Court **DENIES** GTA's motion for summary judgment and **GRANTS-IN-PART** the government's cross-motion for summary judgment. RCFC 56; 35 U.S.C. §§ 102 and 112.

A. GTA Has Not Established A Conception Date Of November 22, 2008

As an initial matter, GTA has not established a conception date of November 22, 2008, for the '489 Patent. The Federal Circuit has held that "[t]he test for conception is whether the inventor had an idea that was definite and permanent enough that one skilled in the art could understand the invention." *Burroughs Wellcome Co. v. Barr Lab'ys, Inc.*, 40 F.3d 1223, 1228 (Fed. Cir. 1994). And so, to establish a conception date for the invention claimed in the '489 Patent, GTA must show that Dr. Basener had an idea that was definite and permanent enough that one skilled in the art could understand the invention claimed in the '489 Patent on November 22, 2008. GTA has not made such a showing in this case.

To support its argument that the conception date for the invention claimed in the '489 Patent is November 22, 2008, GTA relies upon an Unsolicited Draft Proposal, last revised on November 22, 2008, to show that Dr. Basener had conceived of the invention at issue by that date. Pl. Resp. and MSJ at 34; *see also* Pl. Ex. D at ¶ 4; Def. Br. Ex. D. But, a careful review of the Unsolicited Draft Proposal makes clear that this document is a plan for research that does not describe the invention claimed in the '489 patent. *See generally* Def. Br. Ex. D.

Notably, the Unsolicited Draft Proposal states that it is a "proposal" to conduct basic research into the mathematical foundations of target detection. Def. Br. Ex. D at 2 ("We propose to conduct basic research into the mathematical foundations of target detection . . . ."). The Unsolicited Draft Proposal presents a problem—the need to improve target detection algorithms and methodology. *Id.* at 12-14 (discussing the "challenges in the current state-of-the-art target detection"). But, a review of this document shows that the draft proposal does not provide the specific solution claimed in the '489 patent. *See id.* at 14-19. In fact, the specific invention claimed in the '489 Patent is not described anywhere in the Unsolicited Draft Proposal. *See generally id.* Given this, the Unsolicited Draft Proposal does not establish that Dr. Basener had an idea that was definite and permanent enough for a POSITA to understand the invention claimed in the '489 Patent. *Burroughs Wellcome Co.*, 40 F.3d at 1228. And so, the Court **DENIES** GTA's motion for summary judgment and **GRANTS** the government's cross-motion for summary judgment on this issue.[5]

B. GTA Has Not Established A Priority Date Of January 29, 2010

GTA also has not established a January 29, 2010, priority date for '489 Patent. The Court presumes that the priority date for the '489 Patent is the filing date for the patent—January 25, 2011. *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1305-06 (Fed. Cir. 2008). But, GTA can rebut this presumption by "com[ing] forward with evidence to prove entitlement to claim priority to an earlier filing date," such that the patent-in-suit should be deemed as filed

[5] The RIT invention plan and NINJA output upon which GTA also relies to show a conception date of November 22, 2008, are both undated. Def. Br. at 5-6; Pl. Resp. and MSJ at 34-38 (not disputing that the RIT invention plan and the NINJA output relied upon by GTA are undated). And so, neither of these documents can establish a November 22, 2008, conception date for the '489 Patent.

on the filing date of its earlier related patents. *Id.* Again, GTA has not made such a showing here.

GTA relies upon the '065 Provisional Application to show that the '489 Patent is entitled to a January 29, 2010, priority date. But, a careful review of the '065 Provisional Application shows that the '065 Provisional Application does not enable a POSITA to practice the invention claimed in the '489 Patent, which includes target identification as well as target detection.[6] For example, the title of the '065 Provisional Application refers only to target detection and differs from the title of the '489 Patent, which includes target identification. Pl. Ex. C at 2, 6, 11-12. Indeed, as GTA acknowledges, target identification is not mentioned in any of the claims of the '065 Provisional Application. *See id.* at 50-51; Pl. Resp. and MSJ at 40 ("[n]otably, the absence of the term 'identification' in the '065 Provisional [Application] is not surprising . . . .").

In addition, the field, background and detailed description sections of the '065 Provisional Application also make clear that the '065 Provisional Application pertains only to target detection. Pl. Ex. C at 12 (the field section states that "[t]his technology relates to methods for object-based sorting and *target detections* and devices thereof") (emphasis supplied); *id.* (the background section states that "*[t]arget detection* in spectral digital imagery is the identification of known material with a given target spectrum") (emphasis supplied); *id.* at 14-15 (the detailed description section states that "this Object-Based Sorting and Ranking of Target Detections . . . technology is a new method for sorting and ranking *target detection* scores in multi-band spectral imagery.") (emphasis added).[7] Given this, GTA has not shown that the '489 Patent is entitled to an earlier priority date based upon the '065 Provisional Application. And so, the Court **DENIES** GTA's motion for summary judgment and **GRANTS** the government's cross-motion for summary judgment on this issue.[8]

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[6] GTA does not dispute that target identification and target detection are distinct concepts. *See* Pl. Resp. and MSJ at 39-40.

[7] The government also persuasively argues that the statement in the detailed description of the '065 Provisional Application that a "typical library may have 10-50 target signatures" further indicates that the '065 Provisional Application discusses only target detection, because a library sufficient for target identification would require a much larger number of target signatures. Def. Br. at 7; Pl. Ex. C at 16; *see also* Stocker Report at ¶ 35.

[8] The Court is also unpersuaded by GTA's argument that a POSITA would understand the error metric referenced in paragraphs 0006-0008 and page 37 of the '065 Provisional Application to be an object-

C. The Claims Of The '489 Patent Are Anticipated

Turning to the merits of the parties' arguments on patent invalidity, the government has shown by clear and convincing evidence that each and every claim of the '489 Patent is anticipated by the ARCHER system. And so, for the reasons discussed below, the Court concludes that the '489 Patent is invalid for a lack of novelty. 35 U.S.C. § 102(a).

It is well-established that an invalid patent cannot be infringed. *Commil USA, LLC v. Cisco Sys., Inc.*, 135 S. Ct. 1920, 1931 (2015) (Scalia, J., dissenting on other grounds) (recognizing the cardinal maxim that "[i]t follows, as night the day, that only valid patents can be infringed. To talk of infringing an invalid patent is to talk nonsense."). And so, if the government can show that the '489 Patent is invalid, based upon clear and convincing evidence, the Court need not reach the issue of patent infringement in this case. *See, e.g.*, *Del Mar Eng'g Lab'ys v. United States*, 524 F.2d 1178, 1186 (Ct. Cl. 1975) ("[i]n view of the conclusion on validity, it is unnecessary to reach the question of infringement, for an invalid patent cannot be infringed.") (internal citation omitted); *Sparton Corp. v. United States*, 89 Fed. Cl. 196, 242 (2009) (declining to decide infringement after finding two patents invalid for obviousness, and thus holding that the plaintiff "no longer has a claim under 28 U.S.C. § 1498").

With regards to the first ground upon which the government argues that the '489 Patent is invalid—lack of novelty, or anticipation—the Federal Circuit has held that a person cannot obtain a patent unless the invention is new. *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 780 (Fed. Cir. 1985) ("[t]he patent law imposes certain fundamental conditions for patentability, paramount among them being the condition that what is sought to be patented, as determined by the claims, be new."). The pre-AIA version of Section 102, which applies to this case, also provides that:

> A person shall be entitled to a patent unless—
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or
>
> (b) the invention was patented or described in a printed publication in

based identification score. There is no mention of target identification, or an object-based score, in paragraphs 0006-0008 of the '065 Provisional Application. *See* Pl. Ex. C at 15-16.

> this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States[.]

35 U.S.C. § 102(a)-(b) (2006). And so, the '489 Patent is invalid for a lack of novelty, or anticipation under Section 102, if the government can show by clear and convincing evidence that each and every element set forth in the claims of the patent is found, either expressly or inherently, in a single reference. *Atlas Powder Co. v. Ireco, Inc.*, 190 F.3d 1342, 1346 (Fed. Cir. 1999).

In this regard, the Federal Circuit has recognized that "a prior art reference may anticipate when the claim limitation or limitations not expressly found in that reference are nonetheless inherent in it." *Id.* at 1347. And so, "if granting patent protection on the disputed claim would allow the patentee to exclude the public from practicing the prior art, then that claim is anticipated, regardless of whether it also covers subject matter not in the prior art." *Id.* at 1346 (citing *Titanium Metals Corp.*, 778 F.2d at 781).

In this case, the government argues that the Civil Air Patrol ARCHER Hyperspectral Sensor System—or the ARCHER system—is such a single reference. Specifically, the government argues that the ARCHER system anticipates each of the five "top-level" elements found in the '489 Patent—obtain images, apply statistical detection filtering, identify regions and determine object-based scores, determine geographical information for identified regions and provide identified regions and object-based scores with geographical information. Stocker Report at ¶ 44; Def. Br. at 12-13. In this regard, the government contends that the ARCHER system "performed 'numerous real-time processing function[s] including data acquisition and recording, raw data correction, target detection, cueing and chipping, precision image geo-registration, and display and dissemination of images productions and target cue information.'" Def. Br. at 12; Stocker Report at ¶ 54 (observing that "[a]n early demonstration of real-time detection filtering in an operational hyperspectral imaging application was the ARCHER system developed for the Civil Air Patrol in 2004 and deployed the following year."). And so, the government further contends that the '489 Patent is invalid due to a lack of novelty, because the ARCHER system anticipates the use of methods for detailed post-detection analysis of detected

objects based upon spatial and spectral information.[9] Stocker Report at ¶¶ 77-79. For the reasons set forth below, the Court agrees.

1. The ARCHER System Discloses An "Object-Based Spectral Identification Score" And "Object-Based Score"

As an initial matter, the government has shown that the ARCHER system discloses an "object-based spectral identification score" and "object-based score," as described in Claims 1, 4, 5, 10, 13, 14, 19, 21, 22 and 23 of the '489 Patent. Several claims of the '489 Patent contain the limitations "determining with the target detection processing apparatus an object-based spectral identification score for each," "determining . . . an object-based score for each of the identified regions" and "providing with the target detection processing apparatus the one or more identified regions with the determined object-based score for each region." *See, e.g.,* '489 Patent at 7:5-7:10, 7:53-7:54. Given this, GTA's primary rebuttal to the government's anticipation defense is that the ARCHER system does not disclose an "object-based spectral identification score," or an "object-based score," as described in these two limitations. Pl. Resp. and MSJ at 12-17; *see also* '489 Patent at 6:57-7:10. GTA's argument is belied by the undisputed material facts regarding the ARCHER system.

First, the undisputed material facts show that the ARCHER system's approach to target detection includes determining an "object-based spectral identification score" and an "object-based score," as the Court has defined those terms. The Court previously issued a Claim Construction Memorandum Opinion and Order on March 7, 2019, that defined the terms "object-based spectral identification score" and "object-based score" to mean "*any metric that is computed from the pixels in an identified region using a process that provides better understanding of the material or object in the region*." Mar. 7, 2019, Claim Constr. Mem. Op. and Order at 32 (emphasis supplied).

It is undisputed that the Air Force developed the ARCHER system in 2004, and that this system is an airborne real-time cueing hyperspectral enhanced reconnaissance system that incorporates an onboard data processing system to perform numerous real-time processing

[9] During oral arguments, the government clarified that it is arguing that the ARCHER system was known or used by others before the invention of the invention claimed in the '489 Patent, and the government is utilizing the Civil Air Patrol ARCHER Hyperspectral Sensor System reference to provide the description of the ARCHER system. Tr. 21:24-22:4.

functions, including target detection, cueing and chipping, precision image geo-registration and display, and dissemination of image products and target cue information. *See* Def. Br. Ex. I at US_003214; *see also* B. Stevenson et al., *The Civil Air Patrol ARCHER Hyperspectral Sensor System*, 5787 Proc. SPIE 17 (2005); Stocker Report at ¶ 54; *see also* Pl. Resp. and MSJ at 12-17 (showing that GTA does not dispute the nature of the Archer system as described in the Civil Air Patrol ARCHER Hyperspectral Sensor System reference submitted by the government). It is also undisputed that the ARCHER system contains an advanced hyperspectral imaging system, high-resolution camera and an on-board real-time processor, for target detection, display and recording. *Id.* at US_003216; Pl. Resp. and MSJ at 12-17 (showing that GTA does not dispute that the ARCHER system includes a hyperspectral imagining system, high resolution camera and an on-board, real-time processor).

The Civil Air Patrol ARCHER Hyperspectral Sensor System reference and the Strategies for Hyperspectral Target Detection in Complex Background Environments reference also make clear that the ARCHER system's approach to target detection includes determining an "object-based spectral identification score." Specifically, these references explain that the ARCHER system determines a "detection statistic" and "target cues" that provide a better understanding of the material or object detected in a region, by "eliminat[ing] detected pixel groups that do not conform to the expected size range of the [targets]." Def. Reply Br. Ex. A at US_003312. For example, the Civil Air Patrol ARCHER Hyperspectral Sensor System reference explains that the ARCHER system's target detection capabilities include "[a]nomaly detection, to find unusual objects with unknown spectra in real-time" and "[m]atched detection, to find targets with known spectral signatures in real-time." Def. Br. Ex. I at US_003219. Strategies for Hyperspectral Target Detection in Complex Background Environments further explains that the ARCHER system: (1) performs target detection by exploiting the difference in the spectral characteristics of the target of interest relative to the background materials; (2) reports this difference in terms of a "detection statistic" that is "computed on a pixel-by-pixel basis;" and (3) then generates "target cues," by "thresholding the detection statistic image and performing simple . . . filtering to eliminate detected pixel groups that do not conform to the expected size range of the [targets]." Def. Reply Br. Ex. A at US_003312.

Because these references show that the ARCHER system's approach to target detection includes determining a "detection statistic" and "target cues" that provide a better understanding

of the material or object in a region, by "eliminat[ing] detected pixel groups that do not conform to the expected size range of the [targets]," the Court agrees with the government that the ARCHER system determines an "object-based identification score," as that term has been defined by the Court. *Id.*; Mar. 7, 2019, Claim Constr. Mem. Op. and Order at 32. And so, the Court concludes that the ARCHER system anticipates the "determining . . . an object-based spectral identification score for each of the identified regions in said image" limitation found in Claims 1, 10 and 19, and the "determining . . . an object-based score for each region" limitation found in Claims 4, 5, 12, 13, 14, 21, 22 and 23 of the '489 Patent.[10]

The government has also shown that the ARCHER system anticipates the "providing . . . [the] identified regions with the determined object-based score" limitation found in Claims 1, 4, 5, 10, 13, 14, 19, 21, 22 and 23 of the '489 Patent. In this regard, the undisputed material facts show that the ARCHER system's chip viewer window provides the determined detection statistics and target cue information to the ARCHER system operator.

As the government persuasively argued during the oral arguments on the parties' cross-motions, the ARCHER system "does the providing step [of the '489 Patent] because it provides the chip viewer that contains the additional spectral and spatial information" derived from ARCHER's target detection algorithms. Tr. at 62:18-62:21. Specifically, the Civil Air Patrol ARCHER Hyperspectral Sensor System reference explains that, once the ARCHER system detects a possible ground target, the system geo-registers and crops each image "to create a 256 x 256 pixel chip of the target area," which is then "sent to the Chip Viewer window . . . for operator review." Def. Br. Ex. I at US_003220. An example of the chip viewer window is provided in the Civil Air Patrol ARCHER Hyperspectral Sensor System reference and is

[10] During oral arguments on the parties' cross-motions, the government explained that "the signature matched filter" algorithm performed by the ARCHER system "presents detection scores using spatial information," which are "aggregated using the pixels that exceed certain thresholds in its spatial facial process . . . ." Tr. at 59:5-59:11.

reproduced below:

Id. at US_003221; *see also* Stocker Report at 57. As shown in the figure above, the ARCHER system's chip viewer window provides the ARCHER system operator with target cue information, including scores and geolocations for each detected target. *Id.*

Mr. Stocker explains in his expert report that the ARCHER system chip viewer window allows the system operator to rank the cued targets "by their respective detector scores simply by clicking on the displayed column header for those scores (similar to the way one sorts entries in a spreadsheet column)." Stocker Report at ¶ 78. Given this, the undisputed material facts show that the ARCHER system's chip viewer window provides a "metric that is computed from the pixels in an identified region using a process that provides better understanding of the material or object in the region." Mar. 7, 2019, Claim Constr. Mem. Op. and Order at 32. Because the Civil Air Patrol ARCHER Hyperspectral Sensor System reference makes clear that the ARCHER system provides a detection score and other target cue information that provides a better understanding of the material or object for the ARCHER system operator to view in the chip viewer window, the Court agrees with the government that the ARCHER system also anticipates the "providing . . . [the] identified regions with the determined object-based score" limitation found in Claims 1, 4, 5, 10, 13, 14, 19, 21, 22 and 23 of the '489 Patent.[11]

[11] The Court is also unpersuaded by GTA's argument that the "pixel score" (i.e. detection score) determined by the ARCHER system is not an "object-based score," because an object-based score must be calculated from all of the image pixels comprising an object. Pl. Resp. and MSJ at 16. The Court's definition of the terms "object-based score" and "object-based identification score" does not include the limitation that GTA seeks to impose. *See* Mar. 7, 2019, Claim Constr. Mem. Op. and Order at 32.

2. The ARCHER System Discloses Inherent "Masking Out" And "Unmixing" Capabilities

The government has also shown by clear and convincing evidence that the ARCHER system anticipates the "masking out" limitations found in Claims 4, 13, 22, 28, 30 and 32 of the '489 Patent and the "unmixing" limitations found in Claims 5, 14, 23, 29, 31 and 33 of the '489 Patent. As shown in the '489 Patent, these limitations involve: "masking out from each of the regions with the target detection processing apparatus the one or more of the pixels in each of the one or more images which have the highest determined statistical detection scores in each of the one or more images," "masking out from each of the regions the one or more of the pixels in each of the one or more images which have the highest determined statistical detection scores in each of the one or more images," "unmixing with the target detection processing apparatus the pixel with highest determined statistical detection score in each of the identified regions by finding one or more abundances to determine pixel spectra" and "unmixing the pixel with highest determined statistical detection score in each of the identified regions by finding one or more abundances to determine pixel spectra." *See, e.g.*, '489 Patent at 7:60-7:64; 8:22-8:26; 9:40-9:43; 9:64-9:66.

The undisputed material facts show that the ARCHER system's target detection algorithms include an inherent "masking out" step as part of the system's "chipping" function. Mr. Stocker explains in his expert report that "masking out" involves removing high-scoring pixels to characterize background contributions, to provide a representative ensemble for estimating suitable background statistics or endmembers while minimizing contamination from potential targets (i.e. the high-scoring pixels). Stocker Report at ¶ 58 ("We often seek to remove any target-like features from the estimate. This can be attempted by not including (masking) the pixel under test (or a region around the pixel under test) in the covariance matrix estimate." (citation omitted)). As discussed above, the Civil Air Patrol ARCHER Hyperspectral Sensor System reference explains that the ARCHER system includes two target detection algorithms—an anomaly detection algorithm and a matched detection algorithm. Def. Br. Ex. I at US_003219. Mr. Stocker explains in his expert report that the ARCHER system uses these target detection algorithms to define local image regions surrounding pixels or contiguous clusters of pixels that exceed a detection threshold. Stocker Report at ¶ 79. Mr. Stocker further explains that "[t]hese regions [are] referred to as 'chips' and [are] automatically resolution-

enhanced, recorded and displayed in color to the . . . operator to indicate the location of a detected target and its local scene context." *Id.*

Because it is undisputed that the ARCHER system's "chipping" function includes defining image regions and indicates to the ARCHER system operator the location and local image context surrounding identified chips, the Court concludes that the "masking out" step described in the '489 Patent is inherent within the ARCHER system's ability to eliminate pixel groups that do not conform to the detection threshold. And so, the Court concludes that the ARCHER system anticipates the 'masking out" step of Claims 4, 13, 22, 28, 30 and 32 of the '489 Patent.

The undisputed material facts regarding the ARCHER system similarly show that this system anticipates the "unmixing" limitations found in Claims 5, 14, 23, 29, 31 and 33 of the '489 Patent. Spectral unmixing refers to the "procedure by which the measured spectrum of a mixed pixel is decomposed into a collection of constituent spectra, or endmembers, and a set of corresponding fractions, or abundances, that indicate the proportion of each endmember present in the pixel," and was well-known in the art prior to 2011. *See* N. Keshava & J.F. Mustard, *Spectral Unmixing*, 1053-5888 IEE Signal Processing Magazine 44, 44 (Jan. 2002); Stocker Report at ¶ 60. The government conceded during oral arguments that the version of the ARCHER system described in the Civil Air Patrol ARCHER Hyperspectral Sensor System reference does not include an unmixing algorithm. Tr. at 69:3-69:10. But, the government also persuasively argued that the ARCHER system can, nonetheless, support such an unmixing algorithm, because unmixing is inherent within the ARCHER system's capabilities. Tr. at 69:18-69:19.

Mr. Stocker opines in his expert report that "Claim 4 [of the '489 Patent] describes a generic spectral unmixing process in which endmembers are determined from one or more selected pixels in each identified region to define a convex hull (i.e. simplex), and subsequently used to calculate abundances . . . for the endmembers to model detected pixel spectra." Stocker Report at ¶ 108. In this regard, the Strategies for Hyperspectral Target Detection in Complex Background Environments reference provides an overview of different unmixing techniques and approaches that can be implemented in the ARCHER system. *See generally* Def. Reply Br. Ex. A at US_003314-17. For example, the Strategies for Hyperspectral Target Detection in Complex

Background Environments reference discusses the N-FINDR algorithm, which "use[s] . . . the simplex maximization technique," whereby it "selects as endmembers the set of scene spectra that maximizes the volume of a simplex defined with these spectra as endmembers." *Id.* at US_003314. The Strategies for Hyperspectral Target Detection in Complex Background Environments reference also states with regards to the ARCHER system that "[t]he matched subspace, change detection, and spatial-spectral methods overviewed in this paper provide some of the primary avenues that [Air Force Research Laboratory] is pursuing to more fully exploit the inherent detection capabilities supported by such sensor systems." *Id.* at US_003319. Given this, the undisputed material facts regarding the ARCHER system show that the ARCHER system can support an unmixing algorithm of the kind described in the Strategies for Hyperspectral Target Detection in Complex Background Environments reference. *Id.*; *Atlas Powder Co.*, 190 F.3d at 1347 ("[A] prior art reference may anticipate when the claim limitation or limitations not expressly found in that reference are nonetheless inherent in it."). And so, the Court concludes that the ARCHER system also anticipates the unmixing step found within Claims 5, 14, 23, 29, 31 and 33 of the '489 Patent.

3. The Government Has Shown That The ARCHER System Anticipates Every Claim Of The '489 Patent

As a final matter, the undisputed material facts also show that the government has asserted anticipation contentions for every claim of the '489 patent. As discussed above, the government has shown by clear and convincing evidence that the ARCHER system anticipates the limitations found in Claims 1, 4, 5, 10, 13, 14, 19, 21, 22 and 23 of the '489 Patent regarding "determining . . . an object-based spectral identification score for each of the identified regions in [an] image," "determining . . . an object-based score for each of the identified regions" and "providing . . . [the] identified regions with the determined object-based score." The government has also shown by clear and convincing evidence that the ARCHER system anticipates the "masking out" limitations found in Claims 4, 13, 22, 28, 30 and 32 of the '489 Patent and the "unmixing" limitations found in Claims 5, 14, 23, 29, 31 and 33 of the '489 Patent. GTA also does not dispute that the ARCHER system anticipates the other limitations found in these claims. *See* Pl. Resp. and MSJ at 12-17.

A careful review of the government's claims chart and Mr. Stocker's expert report also show that the government has addressed each and every element of the claims of the '489 Patent

and explained why each of these claims were anticipated by the ARCHER system. *See* Stocker Report at ¶ 43 (detailing the redundancies of the claims of the '489 patent), ¶ 86 (discussing claim 4 and equivalent claim 13 and whether these claims are anticipated by ARCHER), ¶ 87 (discussing claim 5 and equivalent claim 14 and whether these claims are anticipated by ARCHER), ¶ 96 (discussing claim 28 and equivalent claims 30 and 32 and whether these claims are anticipated by ARCHER), ¶ 98 (discussing claim 29 and equivalent claim 31 and whether these claims are anticipated by ARCHER); *see also* Def. Br. Ex. J. And so, the Court is satisfied that the government has asserted anticipation contentions for each and every claim of the '489 Patent.

Because the undisputed material facts in this case show that: (1) the ARCHER system discloses an "object-based spectral identification score" and an "object-based score;" (2) the ARCHER system anticipates the "masking out" and "unmixing" limitations found in certain claims of the '489 Patent; and (3) the government has shown by clear and convincing evidence that the ARCHER system anticipates each and every element of Claims 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32 and 33 of the '489 Patent, the Court concludes that the '489 Patent is invalid for a lack of novelty. And so, the Court **DENIES** GTA's motion for summary judgment and **GRANTS-IN-PART** the government's cross-motion for summary judgment on the issue of patent invalidity.[12]

V. CONCLUSION

In sum, GTA has not established a conception date of November 22, 2008, or a priority date of January 29, 2010, for the invention claimed in the '489 Patent. The government has shown, however, by clear and convincing evidence, that the ARCHER system anticipates each and every claim of the '489 patent. And so, for the foregoing reasons, the Court:

1. **DENIES** GTA's motion for summary judgment; and

2. **GRANTS-IN-PART** the government's cross-motion for summary judgment.

Some of the information contained in this Memorandum Opinion and Order may be considered protected information subject to the Protective Order entered in this matter on August

[12] Because the Court concludes that the '489 Patent is invalid for a lack of novelty, the Court does not reach the issues of whether the '489 Patent is invalid due to obviousness and indefiniteness.

13, 2019. This Memorandum Opinion and Order shall therefore be filed **UNDER SEAL**. The parties shall review the Memorandum Opinion and Order to determine whether, in their view, any information should be redacted in accordance with the terms of the Protective Order prior to publication.

The parties shall **FILE** a joint status report, on or before **May 10, 2021**, that:

1. Identifies the information, if any, that they contend should be redacted, together with an explanation of the basis for each proposed redaction.

2. States their respective views regarding how this matter should proceed, in light of the Court's decision on patent invalidity.

IT IS SO ORDERED.

s/ Lydia Kay Griggsby
LYDIA KAY GRIGGSBY
Judge